

F I N A L

RECORD OF DECISION FOR THE FORMER
MANEUVER AREA (MRS FTBLS-002-R-05)

FORMER MANEUVER AREA
FORT BLISS
EL PASO, TEXAS

Prepared for:

United States Army Corps of Engineers – Tulsa District
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List of Acronyms

°F	Degrees Fahrenheit
3Rs	Recognize, Retreat, and Report
ARAR	Applicable or Relevant and Appropriate Requirements
Army	Department of the Army
bgs	below ground surface
BIP	blown-in-place
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	Conceptual Site Model
DGM	Digital geophysical mapping
DoD	Department of Defense
DoDI	Department of Defense Instruction
DPW-E	Directorate of Public Works - Environmental
EOD	explosives ordnance disposal
ESS	Explosives Safety Submission
FS	Feasibility Study
FTBLS-002-R-05 MRS	Former Maneuver Area MRS
FUDS	formerly used defense sites
^{GW} Soil _{Ing}	Soil to Groundwater Protection
HA	Hazard Assessment
HRR	Historical Records Review
IS	incremental sampling
LTM	long-term management
LUC	land use control
MC	munitions constituents
MD	munitions debris
MDAS	material documented as safe
MEC	munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MRA	Munitions Response Area
MRS	Munitions Response Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
No.	Number

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O&M	Operations and Maintenance
PA	Preliminary Assessment
PCL	protective concentration level
PP	Proposed Plan
PTW	principal threat wastes
RAO	Remedial Action Objectives
RI	Remedial Investigation
ROD	Record of Decision
ROEs	rights-of-entry
RRD	range-related debris
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SU	Sample Units
TBC	to be considered
TCEQ	Texas Commission of Environmental Quality
TotSoilComb	Total Soil Combined Exposures
TRRP	Texas Risk Reduction Program
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UU/UE	unlimited use and unrestricted exposure
UXO	Unexploded Ordnance
VSP	Visual Sampling Plan

1.1 SITE NAME AND LOCATION

Site Name: MRS FTBLS-002-R-05

Site Location: Fort Bliss, El Paso, Texas

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the Department of the Army (Army) selected remedy for the Munitions Response Site (MRS) FTBLS-002-R-05 at Fort Bliss, El Paso, Texas. MRS FTBLS-002-R-05 is a site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, 42 United States Code (U.S.C.) §9601 et. Seq. The Army selected the remedy in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practical, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 Code of Federal Regulations (CFR) Part 300. The ROD is based on the administrative record for MRS FTBLS-002-R-05. Fort Bliss maintains this administrative record, which is available for public review.

1.3 ASSESSMENT OF SITE

The response action selected in this ROD is necessary to protect human health and the environment from the potential explosive hazards associated with an encounter with DoD military munitions (munitions) that may be present from past munitions-related activities (e.g., live-fire training or testing). Such munitions may be determined upon evaluation by DoD Explosive Ordnance Disposal or similarly qualified personnel to be munitions and explosives of concern (MEC).

1.4 DESCRIPTION OF SELECTED REMEDY

The Army developed and evaluated remedial alternatives for MRS FTBLS-002-R-05 through a Feasibility Study (FS) completed in 2015 (URS 2016a). Based on the results of the FS, the Army selected Alternative 5 – Surface and Subsurface Removal of Military Munitions as the preferred remedy for MRS FTBLS-002-R-05. Following the Surface and Subsurface removal of Military Munitions, a 3Rs Explosive Safety Education Program will be initiated with follow-on long term management and reviews.

The surface and subsurface removal of military munitions involves removal and disposal of MEC and munitions debris (MD). Surface and subsurface removal of military munitions would significantly reduce the risk of encountering munitions at the MRS.

The surface removal of military munitions would be completed by qualified personnel using hand-held detectors. A typical surface clearance process may involve vegetation removal, partitioning the MRS into grids, and a systematic surface sweep of the grids to remove munitions and possibly other metallic debris. Completing surface removal of military munitions requires a

team of unexploded ordnance (UXO)-qualified personnel to ensure the work is performed safely and in accordance with rules, regulations, and planning documents.

Following the completion of the surface removal of military munitions, removal of subsurface military munitions would be completed. The removal of subsurface military munitions would include a comprehensive analog survey to mag and flag subsurface anomalies using hand-held metal detectors, which would then be removed by hand removal methods.

MEC items would be subjected to an inspection process to determine the explosive hazard and appropriate disposal method. MEC certified as material documented as safe (MDAS) would be reclassified and segregated into MD, range-related debris (RRD), or other debris, and disposed of at a local landfill or recycler, as appropriate. It is estimated that the surface and subsurface removal of military munitions would take approximately seven weeks to complete.

Additionally, the Recognize, Retreat, and Report (3Rs) Explosive Safety Education Program will be implemented as part of this alternative.

1.5 STATUTORY DETERMINATIONS

The selected remedy for MRS FTBLS-002-R-05 is protective of human health and the environment, complies with promulgated federal and state requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective.

Pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C), because the selected remedy may result in Munitions remaining on-site, long-term management reviews will be required. Management reviews of MRS FTBLS-002-R-05, which will be completed once every five years, will assess the selected remedy to determine if the Recognize, Retreat, and Report (3Rs) Explosive Safety Education Program remains protective of human health at MRS FTBLS-002-R-05.

1.6 DATA CERTIFICATION CHECKLIST

In accordance with the U.S. Environmental Protection Agency's Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedial Selection Decision Document (USEPA 1999), the following information is included in this ROD's Decision Summary (Section 2).

- How source materials that may constitute principal threats will be addressed;
- Current and reasonably anticipated future land use assumptions;
- Potential land use that will be available at the site as a result of the selected remedy;
- Estimated capital, annual Operations and Maintenance (O&M), periodic, and total present value costs for all alternatives considered; and

- Key factors that led to selecting the remedy (i.e., describe how the selected remedy provides the best balance of tradeoffs with respect to the threshold, balancing, and modifying criteria).

Additional information for MRS FTBLS-002-R-05 can be found in the Administrative Record file located at:

Directorate of Public Works – Environmental (DPW-E)

Building 622 Taylor Road

Fort Bliss, Texas 79916

(b) (6)

1.7 AUTHORIZING SIGNATURE

On the basis of the Remedial Investigation (RI) and FS performed for MRS FTBLS-002-R-05, the selected remedy meets the requirements for remedial action set forth in CERCLA, as confirmed by the following signature pages. This signature sheet documents the Army's approval of the selected remedy for MRS FTBLS-002-R-05.

Department of the Army

Date

The Decision Summary identifies the Selected Remedy, explains how the remedy fulfills statutory and regulatory requirements, and provides a substantive summary of the Administrative Record that supports the remedy selection decision.

2.1 SITE NAME, LOCATION, AND DESCRIPTION

Fort Bliss is located in portions of Texas and New Mexico, near the town of El Paso, Texas. Of the approximately 1.12 million acres encompassed by the Fort Bliss installation, 12 percent of the installation's total land area is in El Paso County in west Texas, and the remaining 88 percent is in the New Mexico counties of Doña Ana and Otero. **Figure 2-1** shows the boundaries of MRS FTBLS-002-R-05, the location of Fort Bliss, and surrounding communities.

MRS FTBLS-002-R-05 encompasses approximately 203 acres of undeveloped land that is primarily used for ranching and/or recreational hunting (**Figure 2-2**). None of the land included in the boundaries of MRS FTBLS-002-R-05 is currently owned or used by Fort Bliss. According to the RI, the MRS is part of a larger parcel of land currently owned by a State of Texas entity (the Texas General Land Office). This parcel is fenced and currently leased to a private individual and used for ranching and recreational hunting. No cattle were observed at the time the field work was completed, but a corral in the area indicates it has occurred in the past. Vegetation at the MRS was dense and consisted of thorn bushes, yucca, and cactus.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

MRS FTBLS-002-R-05 was formerly part of a training and maneuver area identified as the Former Maneuver Area Munitions Response Area (MRA) (Former Maneuver Area). Various military training exercises were completed at the Former Maneuver Area from 1939 into the 1970s. Previous investigations that the Army conducted at Fort Bliss under the Military Munitions Response Program (MMRP) included:

- Range Inventory Report, issued November 2002 (TechLaw 2002)
- Range Inventory Report, issued January 2003 (e²M 2003)
- Site Inspection Report, issued April 2007 (e²M 2007)
- Historical Records Review, issued October 2009 (TLI Solutions 2009)
- MMRP Site Inspection Report, issued March 2011 (TLI Solutions 2011)
- MMRP RI Report, issued November 2014 (URS 2014)
- Feasibility Study, issued May 2016 (URS 2016a)
- Proposed Plan, issued May 2016 (URS 2016b)

2.2.1 Range Inventory Report (TechLaw 2002)

This was the first of two Range Inventory Reports. The original Former Maneuver Area was not investigated as part of this report. This effort was part of the Preliminary Assessment (PA) phase of the CERCLA process.

2.2.2 Range Inventory Report (e²M 2003)

According to the 2003 Range Inventory Report, the Army identified the Former Maneuver Area as one of five potential MRS. The report stated this site was used for various training exercises from about 1939 into the 1970s. Reportedly, the DoD used aerial rockets (smoke and white phosphorous), practice guided missiles, bombs, and small arms ammunition (SAA) at this MRS. This effort completed the PA phase of the CERCLA process.

2.2.3 Site Inspection Report (e²M 2007)

The 2007 Site Inspection (SI) evaluated potential MMRP-eligible sites at Fort Bliss that the Army previously identified in its Range Inventory Reports. Of the potential MMRP-eligible sites, the Army determined that one site was an operational range and four were formerly used defense sites (FUDS). The Former Maneuver Area was one of the four sites determined to be a FUDS. As such, this site was not evaluated further in the SI report.

2.2.4 Historical Records Review Report (TLI Solutions 2009)

Subsequent to the 2007 SI, the Army completed a Historical Records Review (HRR). This review determined that only a portion of the Former Maneuver Area was FUDS eligible. As a result of the HRR, the Army determined that an SI was needed for the entire Former Maneuver Area. This SI would be conducted under the Active Army MMRP.

The HRR provided details of the ownership and boundaries of the Former Maneuver Area. The HRR also discussed prior military usage, as documented in historical maps, photographs, aerial photographs, and written documents.

During the early 1940s, infiltration courses were constructed. These courses provided areas where troops crawled under barbed wire while being subjected to nearby explosions and overhead machine gun fire. Natural ravines and bluffs were used for foot marches of up to 25 miles with full field equipment. Specific locations for these activities were not identified in historical documents.

Beginning in the 1940s, the Former Maneuver Area was used for anti-aircraft artillery maneuvers. Although live-fire training was not to be conducted so as not to hazard existing air lanes, there are indications that live-fire occurred at times. The Army suspects that anti-aircraft artillery troops trained by firing at targets towed by aircraft.

Portions of the Former Maneuver Area were designated in a 1951 map as being used for high-level bombing and strafing missions, although specific descriptions of such events occurring within the Former Maneuver Area do not appear in other historical documents.

A hand-drawn, unscaled map (1956) depicts a guided missile launch site that appears to reside generally in the southern area of the Former Maneuver Area. Other maps (1951 and 1982) vaguely depict a guided missile launch site in the general area near the Texas-New Mexico border, which may be proximal to the northern part of the Former Maneuver Area. Further information regarding a guided missile launching sites as depicted on these maps was not found in other historical documents. Consequently, the exact location of one or more guided missile launch sites is unclear.

Vintage documents from the 1960s indicated the Former Maneuver Area was comprised of Former Maneuver Area Number (No.) 1 and Former Maneuver Area No. 2. Former Maneuver Area No. 2, which comprised the majority of the Former Maneuver Area, was used for air defense artillery training that included detection, identification, tracking, and simulated engagement of aerial targets. Maneuver Areas No. 1 and No. 2 provided the advantage of having twice the usable tracking azimuth sweep for radar detection of air targets than other maneuver areas at Fort Bliss. The Former Maneuver Area and other areas at Fort Bliss may have also been used for testing and evaluating equipment related to the Nike-Hercules Missile, Air Defense Distribution Systems, Air Defense Communication Systems, and Electronic Countermeasure and Electronic Counter-Countermeasure Systems.

During the 1970s, military units used the Former Maneuver Area for a multitude of field maneuver training exercises. The exercises conducted were described as Operational Readiness Training; Strategic Army Forces and Return of Forces to Germany Battalion exercises; Army Training Tests; Selection and Occupation of Position Training; Adventure Training Exercises; road march, night, and unit and individual training; map and compass course training, including orienteering; Escape and Evasion, Infantry Small Unit Tactics, and Air Defense battalion training; and other tactical training including training of National Guard and Army Reserve units. Details of how the training was conducted and the equipment and weapons used during this training were not provided in the HRR.

Documents indicate the Army conducted clearances activities of maneuver training areas during the 1970s. During these activities, units were to remove refuse, expended small arms cartridge cases (ESACC) and live small arms ammunition, and training devices (e.g., simulators) after training and ensure explosive training devices had detonated or were either retrieved or marked for later retrieval. In 1946, the Army removed Munitions (unexploded ordnance {UXO}, also referred to as duds) and munitions debris (MD) from 1,280 acres of the Former Maneuver Area. In 1992 and 1993, the Army conducted clearance activities at several “hot spots.” However, these areas were north and west of the Former Maneuver Area and within the operational range of Fort Bliss. The HRR did not discuss these clearance events.

Munitions were also discovered at Hueco Tanks State Park. The Texas State Archeologist encountered some of these munitions during an archeological survey conducted at the park between 1999 and 2001. Park visitors also encountered munitions. These munitions, which

were reported to be SAA or ESACCs, are retained as part of an artifacts collection at the park. According to the State Archeologist, the oldest munition recovered was a centerfire cartridge case fragment from a 45 - 70 caliber rifle adopted by the United States military for use from 1873 to 1892. Two World War II munitions recovered were a .50 caliber machine gun case and a 30 - 06 cartridge. The most recent munition the State Archeologist identified was an unfired 5.56 millimeter (mm) centerfire cartridge from the early 1970s.

Based on the HRR, there is a potential for SAA (both live and blanks) and various types of pyrotechnics devices to be encountered within the Former Maneuver Area. The HRR did not confirm the presence of aerial rockets, practice guided missiles, and bombs within the Former Maneuver Area. Potential munitions constituents (MC) suspected to be present include lead, various other metals, and explosives residues.

2.2.5 Site Inspection Report (TLI Solutions 2011)

Information collected during the HRR provided a basis for SI activities. The Army identified 16 investigative areas within the Former Maneuver Area at which a visual survey would be conducted and soil samples would be collected. The Army only acquired a rights-of-entry (ROEs) for only 12 of the 16 areas.

Visual surveys were conducted by personnel walking linear transects and using hand-held electromagnetic metal detectors to look for munitions, MD and range-related debris. Transect paths were determined based on known or suspected points of interest (e.g., firing points, target areas, areas used for open detonation and disposal of munitions, and maneuver areas), terrain, vegetative cover, and site features. Transects provided only a representative coverage of each of the 12 areas for which ROEs were obtained. Groundcover such as leaves, deadfall, grass, and weeds were removed as necessary to expose the ground surface to inspect detected anomalies. Personnel conducting the SI used hand-held global position system units to record the track of each transect line and digitally locate each munition encountered.

Anomalies detected and munitions observed were on the surface. During the SI, subsurface anomalies were not investigated and there were no munitions observed. MD, range-related debris (RRD), and both live SAA and ESAACs were observed in seven of the 12 surveyed areas (Areas 4, 5, 6, 9, 10, 11, and 14). The MD, RRD, and SAA or ESAAC observed consisted of:

Munitions Debris:

- Fragments resulting from high explosive detonations
- Fragments and fuzes from 4.2-inch mortars (Area 4 only)
- A fuze from an expended smoke grenade

Small Arms Ammunition:

- .30-06 blank cartridge casings
- 5.56 mm blank cartridge casings
- 7.62 mm blank cartridge casings
- .30 caliber blank cartridge casings

Range Related Debris:

- '03 Springfield Stripper Clips
- M104 illuminating flare canister lid
- Machine gun links (.30-06, M60, and .30 caliber)
- Belt starter tabs
- M14 rifle clip
- M1 Garand clips

In addition, evidence of military activity, including military tent stakes, chemical lights, communication wire, and a grounding rod for an electrical generator, was identified in one of the surveyed areas (Area 14). A summary of finds for respective surveyed areas is presented in Table 1-3 of the RI Report (URS 2014).

Surface soil samples (zero to six inches below ground surface [bgs]) were collected to evaluate the presence of MC within each of the 12 areas. The Army collected samples from areas where MD was present, there was evidence of past military activities, or locations that generally represented the overall characteristics of the investigation area. Composite soil samples were collected in conjunction with significant MD finds. Composites were formed from seven individual samples collected within one half meter of the suspected impact area. Soil samples required for incremental sampling (IS) were collected in areas at which MD was scattered over a wide area or where there was no evidence that munitions-related activities occurred. IS areas ranged in size from one half to one acre, with 40 to 50 samples collected from each IS area.

Soil samples were analyzed for a subset of the Target Analyte List metals and explosives, as agreed to by stakeholders at a technical project planning meeting. Screening levels used for comparison to metals concentrations were three times the Texas Commission of Environmental Quality (TCEQ) background concentrations. Analytical results for metals indicated concentrations were below applicable screening levels. Screening levels used for comparison to explosives concentrations were United States Environmental Protection Agency (USEPA) Regional Screening Levels; however, explosives compounds were not detected in the soil samples.

In summary, the SI did not observe or detect munitions in the 12 areas within the Former Maneuver Area that were investigated. However, MD was discovered at seven of 12 surveyed areas. For the 12 surveyed areas, there were no explosives-related compounds detected in soil

samples and the concentrations of metals detected were below comparative background levels applicable to the SI (i.e., three times the TCEQ State background levels). Based on the SI results, the following recommendations were made:

- The Former Maneuver Area should be divided into two MRSs, the area adjacent to the installation boundary (Former Maneuver Area A) and the remainder of the Former Maneuver Area (Former Maneuver Area B).
- The Former Maneuver Area A was recommended for additional investigation based on the identification of a mortar impact area, a firing position, and a fighting position.
- Former Maneuver Area B was recommended for No Further Action (NFA) based the results of the field activities conducted for this SI (no evidence of munitions was identified).

2.2.6 Remedial Investigation (URS 2014)

The investigations performed during the SI resulted in the division of the Former Maneuver Area MRS into the Former Maneuver Area A MRS and Former Maneuver Area B MRS. Following the SI, the Army conducted an RI, which is a more comprehensive investigation, of the Former Maneuver Area A MRS. The RI included properties for which the Army received a ROE agreement. The Army received ROE agreements from 1,000 of the 1,036 land owners identified. The ROE agreements obtained allowed the Army access to 89.9 percent (approximately 21,978 acres) of the MRS. The remaining 36 landowners did not respond to the ROE request.

The visual survey completed during the RI identified 12 areas (A through L) within the Former Maneuver Area A MRS for a geophysical survey. Digital geophysical mapping (DGM) transects and 26, 100-percent coverage grids were designated for a geophysical survey areas A through L. Anomalies identified during DGM along the transects and within the grids were investigated.

Following investigation of detected anomalies, the Army conducted MC sampling of soils in representative 100-percent coverage grids and at every location where munitions were blown-in-place (BIP). Analytical results for explosives were compared to the Texas Risk Reduction Program (TRRP) Total Soil Combined Exposures ($^{Tot}Soil_{Comb}$) and Soil to Groundwater Protection ($^{GW}Soil_{Ing}$). In accordance with TCEQ TRRP guidance for metals, the protective concentration level (PCL) was selected using the lower of the $^{Tot}Soil_{Comb}$ and $^{GW}Soil_{Ing}$. This PCL was then compared to the Texas Statewide Background Level. The background level was used as the PCL, if it was higher than the $^{Tot}Soil_{Comb}$, and the $^{GW}Soil_{Ing}$. The IS was used for human health and ecological risk evaluations because it was considered to be more representative of the constituent concentrations across the entire MRS.

The RI investigated the Former Maneuver Area A MRS to characterize the site for the purpose of developing and evaluating remedial alternatives. Based on the results of the RI, the Former Maneuver Area A MRS was recommended to be subdivided into two MRSs to allow for a more accurate depiction of the conditions and risks associated with the former use of each area. The subdivided MRSs recommended in the RI were as follows:

- Former Maneuver Area A (FTBLS-002-R-01) MRS (1,119.69 acres), where five munitions items were identified and disposed.
- Uncontaminated Former Maneuver Area A MRS (FTBLS-002-R-01A) (23,256.99 acres), where no munitions were recovered.

The RI recommended an FS be completed for munitions items and munitions debris (MD) at the aforementioned MRSs.

2.2.7 Feasibility Study (URS 2016a)

During the development of the FS, in order to better facilitate any potential future remedial actions, the boundaries and names of the recommended MRSs in the RI were revised. The Former Maneuver Area A MRS was subdivided into four MRSs rather than the two MRSs originally recommended in the RI. All four MRSs were named the Former Maneuver Area A and were distinguished by new MRS identification numbers. The revision of the naming and the boundaries of the MRSs did not impact the conclusions and recommendations of the RI. The revised subdivision of the Former Maneuver Area A is as follows:

The MRS identified in the RI report as the Uncontaminated Former Maneuver Area A (FTBLS-002-R-01A) was redesignated as MRS FTBLS-002-R-01. The MRS encompasses 23,356.99 acres and is divided into numerous parcels of varying size with approximately 2,514 landowners, although 83 percent of the MRS is owned by 21 landowners. The majority of the area is undeveloped, but portions of the MRS are currently developed with residential homes, commercial businesses, ranching, and light industry. Only the name of this MRS was changed from the RI. The MRS boundary, land parcels included in the MRS, current/historical uses, total acreage, etc. remained unchanged from the RI.

The MRS identified in the RI report as the Former Maneuver Area A (FTBLS-002-R-01) encompassed approximately 1,120 acres and consisted of eastern and western areas that were not contiguous. The parcels within the MRS are owned by one of two different landowners, and in order to simplify any potential future land use agreements and to allow for the selection of a different remedy for each property owner (if warranted or needed with input from the current landowners), this MRS was divided into three MRSs designated as follows.

- The portion of the western area (520 acres) that is currently owned by the private individual was designated as MRS FTBLS-002-R-03.
- The portion of the western area (397 acres) that is currently owned by the Texas General Land Office was designated as MRS FTBLS-002-R-04.
- The eastern area (203 acres) that is currently owned by the Texas General Land Office was designated as MRS FTBLS-002-R-05.

Since the boundaries and parcels included in the MRS changed from the RI, the RI data was reevaluated. Following the reevaluation of the RI data, the conclusions and recommendations

from the RI remained unchanged. The purpose of the FS was to identify and evaluate remedial action alternatives for the MRSs recommended for further action in the Fort Bliss RI Report.

The FS evaluated possible alternatives in detail and completed a comparative analysis based on criteria outlined in the NCP. The five alternatives evaluated were identified as follows:

- Alternative 1 – No Action
- Alternative 2 – Recognize, retreat, and Report (3Rs) Explosive Safety Education Program
- Alternative 3 – Land Use Controls
- Alternative 4 – Surface Removal of DoD Military Munitions
- Alternative 5 – Surface and Subsurface Removal of DoD Military Munitions

Based on the FS analysis, four of the five alternatives were determined to be applicable to MRS FTBLS-002-R-05. The rationale for the exclusion of Alternative 3 – Land Use Controls as a viable alternative was as follows.

- MRS FTBLS-002-R-05 encompasses 203 acres and is owned by the Texas General Land Office. None of the property located within the MRSs is owned or used by Fort Bliss. Implementation of this remedy will require the approval and participation of the landowner.
- Engineering controls would not be effective at limiting receptor exposure to MEC.

Potentially complete pathways for interactions between MEC sources and receptors were identified during the RI. Surface MEC poses the greatest risk to current human health receptors (e.g., trespassers, hunters, and ranchers) within this MRS. A MEC item was discovered on the surface and one MEC item was discovered in the subsurface of this MRS; therefore, Alternative 5 was recommended as the preferred alternative. Alternative 5 – Surface and Subsurface Removal of Military Munitions is technically and administratively feasible (only one landowner), is the most protective of human health, and provides the best balance of long-term effectiveness and reduction of risk to human health. Alternative 5 would potentially allow the Army to pursue NFA for the MRS following the implementation of the alternative.

2.2.8 Proposed Plan (URS 2016b)

The Proposed Plan (PP) presented the findings of the FS. The PP identified the Preferred Alternative for addressing MEC at MRS FTBLS-002-R-05 as Alternative 5 – Surface and Subsurface Removal of Military Munitions.

2.3 COMMUNITY PARTICIPATION

The RI (URS 2014), FS (URS 2016a), and PP (URS 2016b) were made available to the public in June 2016 at the DPW-E located at Building 622 Taylor Road, Fort Bliss, Texas 79916. URS published a public notice of availability for documents in the El Diario de El Paso and the El Paso Times newspapers on November 6, 2016 and November 13, 2016. A public comment

period was held from November 7, 2016 to December 6, 2016. In addition, a public meeting was held at the Montana Vista Elementary School located at 3550 Mark Jason Drive, El Paso, Texas 79938 on Wednesday, November 16, 2016 at 6:30 pm to present the PP to a broader community audience than those who had already been involved at the site. At these meetings, Army, TCEQ, and URS representatives were available to answer questions about the sites and the proposed remedial alternatives/remedies. The Army did not receive comments regarding the PP during the public comment period. A copy of the public notice and the meeting sign-in sheet is included in **Appendix A**.

2.4 SITE CHARACTERISTICS

MRS FTBLS-002-R-05 is a subdivision of the original Former Maneuver Area. The site characteristics presented below are for the original Former Maneuver Area.

2.4.1 Surface Topography

Fort Bliss is located within the Basin and Range physiographic province characterized by narrow, linear faulted mountain chains separated by relatively flat valleys or basins. Eastern portions of the Former Maneuver Area are bordered by the Hueco Mountains, a north-south trending mountain range. Within the area, the Hueco Mountains reach elevations of between 5,000 and 5,500 feet above sea level. The elevated mountain areas transition to relatively flat basins having elevations typically between about 4,200 to 4,500 feet above sea level. Topographic gradient is generally downward toward the west across the Former Maneuver Area, with exception of some isolated, elevated mountains that are separate from the main Hueco Mountain chain.

2.4.2 Climate

Fort Bliss lies within an arid to semi-arid climatic region that receives an average annual precipitation amount of between 9 and 10 inches. Rainfall for the wettest months of the year (July, August, and September) does not typically exceed 2 inches per month. Daily low/high temperature ranges during the coldest months (December and January) are between about 30 degrees Fahrenheit (°F) to 60°F. Daily low/high temperature ranges during the hottest months (June, July, and August) are between about 70°F to 95°F (rssWeather 2011). Prevailing winds are from the south during the summer and from the north during the winter (Weather Explained 2001).

2.4.3 Soils

Soils within and proximal to the Former Maneuver Area can be separated into two general categories based on two distinct physiographic environments. One physiographic environment is the intermountain valleys/basins where soils are characteristically silty, sandy, and gravelly loams that are shallow to deep, nearly level to very steep, and well-drained to excessively drained having formed from alluvium (originating from nearby mountain ranges) and eolian material. The second physiographic environment is the Hueco Mountains and their foot slopes where soils

are either absent due to direct limestone outcrop exposures or characteristically stony loams that are shallow (typically less than 5 inches) and well-drained. Soils within both physiographic environments are generally alkaline and calcareous having been formed principally from the weathering of limestone derived from the Hueco Mountains (USDA SCS 1971).

2.4.4 Geology

The Former Maneuver Area is within the Basin and Range physiographic province of western North America (Seager 1981). Most of the Former Maneuver Area is situated over a structural basin filled with Quaternary-aged sediments derived from the Hueco Mountains to the east. The basin is called the Hueco Bolson and consists of a thick sequence of layered fluvial, alluvial fan, evaporite, and eolian sediments (Sheng, et al. 2001). The Hueco Mountains reside along the eastern edge of the Former Maneuver Area. Outcrops in the Hueco Mountains are primarily of Pennsylvanian and Permian-aged limestone (US Army 1984). Associated with the Hueco Mountain range are remnants of igneous plutons that intruded into the area later during the late Tertiary Period following Basin and Range formation. The outcrops at Hueco Tanks State Park and to the northwest of the park (within the Former Maneuver Area) represent igneous plutons that intruded into the area during that time (Cornet 2005).

2.4.5 Hydrogeology

The Hueco Bolson aquifer is the saturated portion of the Hueco Bolson. The Hueco Bolson aquifer consists of unconsolidated to slightly consolidated deposits composed of fine- to medium-grained sand with interbedded lenses of clay, silt, gravel, and caliche. The sediments have a maximum thickness of 9,000 feet. However, the bottom part of the Hueco Bolson is primarily clay and silt. Therefore, only the top several hundred feet produce good-quality water. Depth to groundwater in the Hueco Bolson in the vicinity of El Paso is reported to be between 250 and 400 feet below ground level. Another similar aquifer located on the west side of the Franklin Mountains and west of Fort Bliss is called the Mesilla Bolson aquifer (Sheng, et al. 2001).

2.4.6 Hydrology

Major surface water bodies do not reside within or proximal to the Former Maneuver Area. Waterways carry surface water generally westward across the intermountain basin where the drainage water evaporates or infiltrates downward into the subsurface before it can reach the Rio Grande River. Playas exist sporadically and will hold surface water for brief periods of time (up to a few weeks) following precipitation events. Playas remain dry for most of the year but are able to briefly hold water without significant downward percolation due to their high silt and clay content (Fort Bliss 2001). The potential presence of a playa is not anticipated to impact the remedy selected for MRS FTBLS-002-R-05.

2.4.7 Vegetation

Basin areas isolated from topographically elevated mountains are characterized by basin desert shrublands. Common plant varieties found in basin desert shrubland areas are honey mesquite (*Prosopis glandulosa*) and four-winged saltbrush (*Atriplex canescens*) with mesa dropseed (*Sporobolus flexuosus*) existing sparsely as undergrowth. These plants are associated with coppice sand dunes found throughout basin areas. Sandsage (*Artemisia filifolia*) can be common in some basin desert shrublands areas (Fort Bliss 2001).

As topographic elevations increase on alluvial fan toe slopes of mountainous areas, desert shrublands vegetation gives way to species dominated by tarbush (*Flourensia cernua*), creosotebush (*Larrea tridentate*), and bush muhly (*Muhlenbergia porter*). Tobosagrass (*Hilaria mutica*) and burrograss (*Scleropogon brevifolius*) can also be common. The highest elevations within Former Maneuver Area are characterized by rocky slopes (Hueco Mountains and unnamed mountains) that are dominated by lechugilla (*Agave lechuguilla*) and creosote bush (*Larrea tridentate*). Grasslands are supported on high elevation alluvial deposits where sideoats grama (*Bouteloua curtipendula*) and black grama (*Bouteloua eriopoda*) are common. Other vegetation varieties that can exist at high elevations are curleyleaf muhly (*Muhlenbergia setifolia*), skeletonleaf goldeneye (*Viguiera stenoloba*), ocotillo (*Fouquieria splendens*), common stool (*Dasyllirion wheeleri*), and soaptree yucca (*Yucca elata*) (Fort Bliss 2001).

Sneed's pincushion cactus is the only threatened/endangered plant known to exist within El Paso County, Texas. Limestone outcrops within the Hueco Mountains would appear to provide the habitat preferred by this species. However, its El Paso County presence is known only to the Franklin Mountains which are located about 25 miles west of the Former Maneuver Area (Heil and Brack 1986; Answers.com 2012). No endangered vegetation species were identified at MRS FTBLS-002-R-05 during the completion of the RI.

2.4.8 Wildlife

Invertebrates identified on and near the Former Maneuver Area include grasshoppers, beetles, flies, butterflies, ants, and termites. Ants and termites are the most numerous invertebrates and play important roles in affecting soil properties and consuming vegetation. Insect larvae and shrimp-like crustaceans (*Eulimnadia texana*) hatch during rainy seasons in playas and arroyos (Fort Bliss 2001).

Amphibian species on and near Former Maneuver Area are primarily toads. The most diverse reptile group is lizards. The western marbled whiptail (*Cnemidophorus marmoratus*) and the Texas horned lizard (*Phrynosoma cornutum*) are most common with the leopard lizard (*Gambelia wislizenii*), striped whiptail (*Cnemidophorus inornatus*), side-blotched lizard (*Uta stansburiana*), and marbled whiptail lizard (*Cnemidophorus marmoratus*) being common but more prevalent in desert shrubland habitat. Almost as diverse as lizards are snakes. The western diamondback rattlesnake (*Crotalus atrox*) and bull snake (*Pituophis catenifersayi*) are most common with the Texas long-nosed snake (*Rhinocheilus lecontei*) common but more prevalent in desert shrubland habitat (Fort Bliss 2001).

Birds provide the highest number of species within an animal group. Over 300 bird species have been recorded for Fort Bliss. Species numbers restricted to Former Maneuver Area are not known. Most species are observed only during annual migrations or reside at Former Maneuver Area seasonally, rather than year-long. Indigenous birds most common to desert shrub habitat are the black-throated sparrow (*Amphispiza bilineata*), western kingbird (*Tyrannus verticalis*), Scott's oriole (*Icterus parisorum*), and ash-throated flycatcher (*Myiarchus cinerascens*). The most common indigenous bird species associated with arroyos and upland habitats are the black-throated sparrow, northern mocking bird (*Mimus polyglottos*), verdin (*Auriparus flaviceps*), brown-headed cowbird (*Molothrus ater*), mourning dove (*Zenaida macroura*), and ash-throated flycatcher. The Swainson's hawk (*Buteo swainsonii*) and turkey vulture (*Cathartes aura*) are the most common raptors in the desert shrublands. Other birds of prey (falcons, hawks, eagles) may be seen in conjunction with mountainous areas (Hueco Mountains). Other bird species common to mountainous areas are the cactus wren (*Campylorhynchus brunneicapillus*), canyon towhee (*Pipilo fuscus*), house finch (*Carpodacus mexicanus*), and varieties of quail, in addition to mourning dove and northern mockingbird which also reside in desert shrubland habitat (Fort Bliss 2001).

Rodent species are numerous and widespread at the Former Maneuver Area. The most common rodents are the silky pocket mouse (*Perognathus flavus*) and Merriam's kangaroo rat (*Dipodomys merriami*). Rodent populations are greater in and along arroyos than adjacent upland habitats. The desert cottontail (*Sylvilagus audubonii*) and black-tailed jackrabbit (*Lepus californicus*) are common, particularly in desert shrubland habitat (Fort Bliss 2001).

Predators found at the Former Maneuver Area consist of the coyote (*Canis latrans*), kit fox (*Vulpes macrotis*) badger (*Taxidea taxus*), and bobcat (*Lynx rufus*). Mountain lions (*Puma concolor*) are rare in the area. Mountain lions and black bears are more likely to reside in mountainous regions further north (such as the Sacramento Mountains, Organ Mountains, and San Andreas Mountains) (Fort Bliss 2001).

Big game animals occurring include the mule deer (*Odocoileus hemionus*) and pronghorn antelope (*Antilocapra americana*). Oryx gazelle (*Oryx gazella*), a native African species, have been introduced into New Mexico and have become common in northern regions of Fort Bliss but are not likely to be seen at Former Maneuver Area (Fort Bliss 2001).

Information regarding threatened and endangered species with potential to occur in the Former Maneuver Area was obtained from the United States Fish and Wildlife Service and Texas Parks and Wildlife Department as part of the RI. This information summarized in **Table 2-1** identified threatened/endangered species that are reported to exist or potentially exist in El Paso County and require vegetative habitats that exist at the Former Maneuver Area as described in **Section 2.4.7**. No endangered wildlife species were identified at MRS FTBLS-002-R-05 during the completion of the RI.

2.4.9 Cultural Resources

The Texas Historical Commission Archeological Sites Atlas was queried to ascertain specific archeological site information for the Former Maneuver Area as part of the RI. Twenty archeological sites were documented as being within the Former Maneuver Area based on geographic information system coordinate data (**Table 2-2**). All but three of the 20 sites were documented as prehistoric artifact scatters, camps, or habitation sites. The other three sites were classified as “unknown.” Two of the 20 sites were determined eligible for listing in the National Register of Historic Places and should be avoided or protected.

2.4.10 Conceptual Site Model

A conceptual exposure model was developed to depict the potential relationship or exposure pathway between MEC/MC sources and receptors. An exposure pathway describes the means by which a receptor can be exposed to MEC and/or MC at the MRS.

The MEC conceptual site model (CSM) for MRS FTBLS-002-R-05 is presented in **Figure 2-3**. Based on the results of the RI, the CSM was updated as follows:

- A target area was identified during the RI at MRS FTBLS-002-R-05. MEC identified in this target area were identified as 4.2 inch mortars. The majority of the MD identified were 4.2 inch mortar fragments. The 4.2 inch MEC/MD identified confirmed the use of the MRS as a target area. The remaining MD identified suggests maneuver activities were also completed in this area.
- Two MEC items were identified during the RI in the target area located within the MRS.
- MD was identified throughout MRS FTBLS-002-R-05 and is anticipated to be primarily related to target area activities.
- MC sampling was completed at MRS FTBLS-002-R-05. No MC were identified above the human health and ecological screening levels except lead which was within state-wide background levels. Therefore, the pathway for MC is considered to be incomplete.

CSMs identify potentially complete or incomplete pathways for MEC sources and receptors at delineated MRSs. MEC exposure media primarily consists of surface soils, although shallow subsurface soils may be encountered by construction workers. A CSM was prepared for MC (**Figure 2-4**) to reflect the fact that MC incremental samples were below their respective risk-based screening levels or were within state-wide background concentrations established by the TCEQ. Groundwater pathways were considered incomplete due to the lack of MC contamination in surface soils discovered in the RI. Surface water/sediment pathways were considered incomplete because surface water is generally not present on the site except as short-lived streams and playas.

2.5 CURRENT AND POTENTIAL FUTURE LAND USES

Current receptors were identified as trespassers, ranchers and recreational users (hunters). Future receptors were identified as site workers, construction workers, hunters, ranchers, trespassers, residents, and/or ecological receptors. Ranching and recreation were identified as current land uses. Future uses are anticipated to be consistent with the current land uses.

2.6 SUMMARY OF SITE RISKS

This section summarizes the risk assessments that have been performed at MRS FTBLS-002-R-05. The risks associated with MEC, the potential receptors, and exposure pathways of primary concern have been assessed. Based on the presence of unacceptable risks to trespassers, hunters and ranchers, remedial action is being recommended to reduce the risks.

2.6.1 MEC Hazard Assessment

The MEC HA (USEPA 2008) was selected as the risk assessment methodology for MRS FTBLS-002-R-05. The MEC HA supports the hazard management decision-making process by analyzing site-specific information. The MEC HA methodology differs from traditional methods of responding to releases of hazardous substances, pollutants, or contaminants. An explosive hazard can result in immediate injury or death; therefore, it is fundamentally different from assessing chronic chemical exposure and focuses on acute explosive hazards. Risks from MEC are evaluated as either being present or not present. If the potential for an encounter with MEC exists, the potential risk of injury or death also exists. A MEC HA is structured around three components of potential explosive hazard incidents:

- Severity – the potential consequence (e.g., death, injury, property damage, etc.) of an explosion from a MEC item
- Accessibility – the likelihood of a receptor to come in contact with the MEC item
- Sensitivity – the likelihood that a receptor will interact with a MEC item and cause it to detonate

The MEC hazard score does not result in a quantitative measure of explosive hazard; rather, the MEC hazard score falls within one of four defined ranges referred to as hazard levels, with hazard level 1 being the highest risk of explosive hazard, and hazard level 4 being the lowest risk of explosive hazard. These categories do not have specific meaning and do not quantify a MEC hazard, but are useful for comparing relative MEC hazards. MEC hazard scores are evaluated using a baseline condition based on observations made regarding site conditions during the RI. The MEC hazard scores were then reevaluated based on the theoretical completion of a surface cleanup and a subsurface cleanup to determine the potential effect of removal actions at the site. The removal of surface and/or subsurface MEC alters the MEC score by changing the scores in the Accessibility section of the MEC hazard evaluation. This reduction in MEC does not affect the Severity or Sensitivity scores in the MEC HA.

MRS FTBLS-002-R-05 has a baseline MEC HA of 1. The completion of a surface removal action would result in a MEC HA of 2. The completion of a surface and subsurface removal action to 4 feet bgs would result in a MEC HA of 3. Additional information regarding the MEC HA scores can be found in Appendix D of the RI (URS 2014).

2.6.2 Munitions Constituents

MC was sampled for at MRS FTBLS-002-R-05 using IS. Maximum detected concentrations of MC were compared to the TRRP ^{Tot}SoilComb and ^{GW}SoilIng.

In accordance with TCEQ TRRP guidance for metals, the PCL was selected using the lower of the ^{Tot}SoilComb and ^{GW}SoilIng. This PCL was then compared to the Texas Statewide Background Level. The background level was utilized as the PCL if it was higher than the ^{Tot}SoilComb, and the ^{GW}SoilIng.

MC sampling was performed for surface soils located in four grid SUs and one BIP sample location at the MRS FTBLS-002-R-05. Grid sampling utilized an IS method while BIP sampling utilized a composite sampling method. With the exception of lead, all incremental sample results were below the human health and ecological screening levels. Lead concentrations were identified in excess of the human health and ecological screening levels, but the concentrations were below the state-wide background concentrations for lead established by the TCEQ.

Lead was identified at a concentration exceeding the soil-to-groundwater human health screening level at the BIP sample location. However, the lead concentration was within the background level for lead established by the TCEQ. Therefore, lead was not considered to represent a human health risk. No additional metals were detected above screening levels in the composite sample collected from the BIP location.

Based on the results of the MC IS, NFA was recommended for MC at MRS FTBLS-002-R-05.

2.6.3 Basis for Action

The response action the Army selected and that is outline in this ROD is necessary to receptors to interact with munitions that may remain present and be encountered at MRS FTBLS-002-R-05.

2.7 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are site-specific cleanup objective that are established based on the nature and extent of contamination, potential for human and environmental exposure, and Applicable or Relevant and Appropriate Requirements (ARARs). Development of the RAOs for MRS FTBLS-002-R-05 focused on addressing the physical hazards to human receptors based on the potential presence of MEC. The RAO proposed for MRS FTBLS-002-R-05, which may consider the current and potential future land uses, is to reduce the potential human receptors to interact with a munitions that may remain present and be encountered.

2.8 DESCRIPTION OF ALTERNATIVES

The alternatives designed to satisfy the RAO include the following:

- Alternative 1 – No Action
- Alternative 2 – Implementation of a 3Rs (Recognize, Retreat, Report) Explosive Safety Education Program
- Alternative 3 – Land Use Controls
- Alternative 4 – Surface Removal of DoD Military Munitions
- Alternative 5 – Surface and Subsurface Removal of DoD Military Munitions

2.8.1 None of the property located within the MRS is owned or used by Fort Bliss. Because Fort Bliss does not own the property, implementation of Alternatives 2 through 5 would require the approval and participation of the landowner. Alternative 1 – No Action

The No Action alternative assumes no further action would be taken at MRS FTBLS-002-R-05. This alternative provides value for comparing other alternatives (e.g., treatment, engineering or institutional controls). This alternative, which would have no capital or O&M costs, is required by the NCP to be considered for baseline comparison purposes (40 CFR 300.430[e][6]).

2.8.2 Alternative 2 – Recognize, Retreat, and Report (3Rs) Explosive Safety Education Program

Alternative 2 includes an explosive safety education program to promote communication between the public and Fort Bliss, and to inform receptors of the risks associated with munitions that may be encountered at MRS FTBLS-002-R-05. Five-year reviews would be required to evaluate the continued effectiveness and permanence of this alternative.

The 3Rs Program would be implemented in accordance with the Fort Bliss Community Relations Plan. Public may include federal, regional, state, local, and Native American governmental entities and officials; public and private organizations; and individuals. The Fort Bliss 3Rs Program may consist of the following:

- Maintaining the administrative record and information repository
- Preparing and issuing press releases
- Preparing and distributing fact sheets
- Updating the Public Affairs Mailing List
- Public meetings

The administrative record file includes documents such as site reports, technical summaries, transcripts, press releases, and fact sheets. The administrative record is located at Fort Bliss.

Prepared statements would be released to local newspapers and radio and television stations as needed. Fort Bliss' Public Affairs Office (PAO) will mail the news releases to the media and placed in the information repository. Fact sheets would be prepared as required. Fact sheets would be mailed to parties in the Public Affairs Mailing List. In addition, copies of each fact sheet would be placed in the administrative record.

Public meetings would be held at locations convenient to the community as required, to provide the public additional information about military munitions and the MRS. Fort Bliss' PAO will place public notices announcing public meetings in the appropriate local media, and the meetings.

2.8.3 Alternative 3 – Land Use Controls

Alternative 3 includes all of the components of Alternative 2 plus additional LUCs in the form of engineering controls (**Figure 2-5**). The engineering controls would limit human exposure to MRS FTBLS-002-R-05 by providing a physical barrier (i.e., fence) and warnings (i.e., signs). This alternative does not allow UU/UE. Five-year reviews (a minimum frequency of once every five years after initiation of the selected remedial action) would be required to evaluate the continued effectiveness and permanence of this alternative. Annual site inspections would be completed until the first five-year review. Following the first five-year review, the site inspection frequency would be adjusted based on the effectiveness of the remedy.

Engineering controls would consist of fencing and signage around the perimeter of MRS FTBLS-002-R-05 to prevent inadvertent access to the MRS and to inform site receptors of the potential MEC risks. The perimeter of MRS FTBLS-002-R-05 is approximately 12,948 linear feet. Signs would be installed at access roads and every 500 feet around the entire perimeter of this MRS. Fencing and signs would be installed by construction workers supported by UXO personnel providing UXO safety support. This support would consist of a minimum of two qualified DoD explosive ordnance disposal (EOD) or contractor UXO-qualified personnel (i.e., one UXO Technician III and one UXO Technician II). The probability of encountering UXO along the perimeter of the MRS during construction is considered low; therefore, an Explosives Safety Submissions (ESS) is not anticipated to be required for the UXO safety support.

Future decisions about land use would drive long-term management (LTM) requirements. LTM includes actions such as O&M of engineering controls and assessment of future actions required to address any changes to land use. For example, if land use changes from undeveloped to residential or some other unanticipated use, LTM decisions would need to be made with respect to the appropriate response action required (e.g., clearance and removal activities and/or construction support).

None of the property located within the MRS FTBLS-002-R-05 is owned or used by Fort Bliss. Because the property is not owned by Fort Bliss, implementation of this remedy will require the approval and participation of the landowner.

2.8.4 Alternative 4 – Surface Removal of Military Munitions

Alternative 4 includes the surface removal of military munitions for MRS FTBLS-002-R-05 (203 acres) (**Figure 2-6**). Surface removal of military munitions involves removal and disposal of munitions encountered, including munitions determined to be MEC and MD. Surface removal of military munitions for the MRS would reduce the risk of site receptors encountering surface MEC, but would not address subsurface MEC or the potential for subsurface MEC to be exposed on the surface through erosion. With the potential munitions to remain present in the subsurface, Alternative 4 would include implementation of the 3Rs Explosive Safety Education Program as described in Alternative 2 at MRS FTBLS-002-R-05. Additionally, LUCs (e.g., warning signs, fences) would be installed as part of this alternative to reduce the potential for human exposure to munitions that may remain present.

The surface removal of munitions would be completed by qualified personnel (e.g., UXO-qualified personnel) using the best available and most appropriate technology. A typical surface removal of munitions from an MRS may involve clearance of vegetation, partitioning the MRS into grids, and a systematic surface sweep of the grids to remove munitions, MD and other metallic debris.

MEC items would be subjected to an inspection process. Munitions determined to be MEC for which the risk of movement is determined unacceptable would be BIP. Munitions for which the risk of movement is acceptable will be consolidated by UXO-qualified personnel for disposal in a consolidated shot. MD and other material documented as safe (MDAS) would be segregated, and secured and be recycled or disposed of in accordance with local laws and regulations.

The Army estimated the field time required to complete this alternative based on the time required to complete a surface removal of the MRS 'total acreage. UXO teams will complete systematic sweeps with magnetometers over the surveyed grids.

MRS FTBLS-002-R-05 encompasses 203 acres. Completion of a surface clearance for the MRS is anticipated to require approximately 4 days (1 week) to complete. This estimate assumes two 20-man UXO teams would complete the MEC surface clearance for 203 acres at a rate of 50 acres per day, working four 10-hour days per week. Because Fort Bliss does not own the property, implementation of this alternative will require the landowners' approval and participation.

2.8.5 Alternative 5 – Surface and Subsurface Removal of Military Munitions

Alternative 5 includes the surface removal of military munitions described in Alternative 4 and includes MEC subsurface removal actions for MRS FTBLS-002-R-05 (203 acres) (**Figure 2-7**). The surface and subsurface removal of military munitions involves removal and disposal of MEC and MD. For this alternative, it is assumed that the subsurface removal action would generally be completed to depths of less than 4 feet bgs.

Surface and subsurface removal of military munitions would significantly reduce the risk of encountering munitions at the MRS.

Following the completion of the surface removal of military munitions, the Army would conduct a subsurface removal. Subsurface removal actions would include a comprehensive geophysical survey to detect subsurface anomalies. Subsurface anomalies determined to most likely be munitions or that cannot be discriminated would be investigated, with munitions or MD encountered removed.

A subsurface removal action would be completed by UXO-qualified personnel using best available and most appropriate technology. A typical subsurface removal action involves a geophysical survey for anomalies, selection of anomalies that are most likely munition or that cannot be discriminated, investigation of selected anomalies (targets of interest), removal of munitions, MD or other metals encountered, determination of the explosives safety status, with disposal of material documented as an explosive hazard by detonation and disposal of MDAS by recycling or disposal at a landfill.

Munitions determined to be MEC for which the risk of movement is determined unacceptable would be BIP. Munitions for which the risk of movement is acceptable will be consolidated by UXO-qualified personnel for disposal in a consolidated shot. MD and other MDAS would be segregated, and secured and be recycled or disposed of in accordance with local laws and regulations.

The estimated quantity of potential anomalies for MRS FTBLS-002-R-05 was calculated using data obtained from the RI's DGM and intrusive investigation results. The geophysical investigation for this MRS covered 48,322 linear feet and 4 grids with nominal dimensions of 100 feet by 100 feet. Assuming a 2.5-foot coverage width for DGM transect surveys, the approximate area covered for this MRS was 120,805 square feet or 2.77 acres. A total of 129 targets were identified by DGM. The average density for the investigated areas was 47 targets per acre. Since the RI grid selection was biased towards areas with greater anomaly densities, this number may represent a higher than normal density than the remainder of the MRS. Further analysis of MRS FTBLS-002-R-05 was completed using VSP Geostatistical Density Mapping. The VSP indicated anomaly densities ranging from low to high throughout the MRS (i.e., 0 to 40 anomalies per acre). Based on VSP, the average anomaly density for this MRS was estimated at 10 anomalies per acre.

The Army estimates implementation of this alternative to take less than one field season to complete. The time estimate for the surface removal of military munitions is based on the assumptions that two 20-man UXO teams would complete the surface removal of military munitions of 203 acres at a rate of 50 acres per day, working four days per week. The length of time for the MEC subsurface removal action is based on the assumptions that five 7-man UXO teams would investigate and resolve an estimated 2,030 anomalies over 203 acres at a rate of 30 acres per day, working four 10-hour days per week. Because Fort Bliss does not own the property, implementation of this alternative will require the landowner's approval and participation.

Additionally, the 3Rs Explosive Safety Education Program shall be implemented as part of this alternative as described in Alternative 2 at MRS FTBLS-002-R-05, in order to provide an additional layer of protection and reduction of risk.

2.9 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, the alternatives for MRS FTBLS-002-R-05 were evaluated using the nine criteria described in Section 121(a) &(b) of CERCLA and 40 CFR Section 300.430(e)(9)(i) as cited in NCP §300.430(f)(5)(i). These criteria are classified as threshold criteria, primary balancing criteria, and modifying criteria.

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria—the alternative must meet them or it is unacceptable. The following are classified as threshold criteria:

- Overall protection of human health and the environment – determines whether an alternative eliminates, reduces, or controls threats to public health and the environment.
- Compliance with or an applicable waiver of ARARs – evaluates whether the alternative meets selected federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Balancing criteria weigh the tradeoffs between alternatives. These criteria represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. In general, a high rating on one criterion can offset a low rating on another balancing criterion. Five of the nine criteria are considered balancing criteria:

- Long-term effectiveness and permanence – considers the ability of an alternative to maintain protection of human health and the environment over time.
- Reduction of toxicity, mobility, and volume through treatment – evaluates an alternative’s use of treatment technologies to reduce the toxicity, mobility, or volume of a contaminant at a site.
- Short-term effectiveness – considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
- Implementability – considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
- Cost – includes estimated capital and annual O&M costs. Cost estimates are expected to be accurate within a range of +50% to –30%.

Modifying criteria which may be considered to the extent that information is available during the FS, but can be fully considered only after public and regulator comments, are as follows:

- Community acceptance – considers whether the local community agrees with the remedial alternative. Comments received on the PP are an important indicator of community acceptance.
- State/support agency acceptance – considers whether the state agrees with the remedial alternative.

An evaluation of the alternatives requiring detailed analysis was conducted against the nine criteria identified above. The detailed analysis summary can be found in **Table 2-3**. In addition, an analysis was conducted to compare the alternatives against each other in order to determine the Preferred Alternative. The comparison of the alternatives to the nine evaluation criteria is discussed below.

2.9.1 Overall Protection of Human Health and the Environment

Alternative 1 is the least protective of the alternatives. Alternatives 2 and 3 provide a low level of protection for human health through LUCs (i.e., 3Rs Explosive Safety Education Program and/or engineering controls). Alternatives 1, 2, and 3 do not provide a reduction of the explosive hazards potentially posed by MEC, because munitions potentially present would not be removed or reduced. Risks to current and future receptors would remain indefinitely. Alternatives 4 and 5 provide greater levels of protection than Alternatives 1, 2 and 3 by eliminating or reducing the explosive hazards posed by MEC, if present, through removal actions. Alternative 5 is considered the most protective of human health because detected munition, including those determined to be MEC, MD and RRD would be removed from the surface and subsurface. The Army does not expect the presence of munitions to have a significant negative impact on the ecosystem.

2.9.2 Compliance with Applicable or Relevant and Appropriate Requirements

Planning would be required for Alternatives 3, 4, and 5 to comply with chemical-specific, location-specific, and action-specific ARARs. For Alternative 3, compliance with ARARs would be limited to activities related to the installation of fencing and warning signs. Compliance with ARARs for Alternatives 4 and 5 would require greater planning required by the application of DoD explosives safety criteria and compliance with applicable laws and regulations. Additionally, the potential impact to endangered species or critical habitat, if present, from the clearance of vegetation and conduct of the removal of munitions from the surface would need to be addressed.

2.9.3 Long-Term Effectiveness and Permanence

Alternative 1 does not provide long-term effectiveness or permanence for the MRSs because munitions that may remain present would not be addressed; therefore, the potential exposure pathways between site receptors and MEC, if any present, would remain.

Alternatives 2 and 3 provide some long-term effectiveness and permanence through implementation of LUCs (i.e., 3Rs Explosive Safety Education Program and/or engineering controls). The overall effectiveness of the LUCs would depend on the support, involvement, and willingness of site receptors (e.g., local agencies, landowners).

Alternatives 4 and 5 provide greater long-term effectiveness and permanence because these alternatives include an investigation for and removal of munitions that may be present. As such, they reduce the potential for receptors to encounter and interact with munitions (i.e., exposures). Alternative 4 only includes a surface removal of munitions. As such, it would be less effective

in the long-term when compared to the removal of munitions from both the surface and subsurface as would occur with implementation of Alternative 5.

Each of the alternatives would involve some residual risk, although remote, because some munitions present may be undetected. The greatest reduction in residual risk would be achieved with Alternative 5, which provides the greatest long-term effectiveness and permanence.

2.9.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Toxicity and mobility factors are not specifically applicable to military munitions. Alternatives 1, 2, and 3 do not provide for a reduction in the volume of military munitions potentially present. Alternative 4 would reduce the volume of munitions on the surface, and Alternative 5 would reduce the volume of munitions on the surface or in the subsurface. Reduction in military munitions, including those determined to be MEC, during Alternatives 4 and 5 would be accomplished by disposal operations.

2.9.5 Short-Term Effectiveness

Alternatives 1 and 2 have no short-term impacts to the community, workers, or the environment. Alternatives 3, 4, and 5 have minimal impacts to the community. Alternative 3 has relatively higher potential risks than Alternatives 1 and 2 because fence and sign installation around the perimeter of MRS FTBLS-002-R-05. Workers who install the fencing and signs would potentially be exposed to surface and/or subsurface MEC, but UXO safety support procedures would be utilized to lower the risk of MEC interaction. Alternatives 4 and 5 pose the highest potential risks to site workers from the handling of MEC, if any, during surface and subsurface removal of military munitions. Appropriately trained personnel, safety procedures, protective equipment, and approved planning documents (e.g., Required Explosives Safety Submission) would be used to reduce impacts to the workers, environment, and community. The duration of worker exposure to potential safety hazards would be dependent on available resources to complete the fieldwork.

2.9.6 Implementability

Alternative 1 has no action to implement. Alternatives 2, 3, 4, and 5 are technically feasible and the services and materials necessary to implement these alternatives are available.

Alternative 2 does not require construction or ROE agreements. Administratively, a process substantially similar to this alternative was implemented at Fort Bliss (i.e., Community Involvement Plan) during the RI; therefore, this alternative is considered administratively feasible.

Alternatives 3, 4 and 5 would be more difficult to implement administratively. According to the RI, MRS FTBLS-002-R-05 is currently owned by a private individual. Therefore, a ROE agreement would be required to allow the Army access to this property. In comparison to the other alternatives that require action, Alternative 2 is the easiest to implement.

2.9.7 Cost

The total estimated costs for implementing the alternatives at MRS FTBLS-002-R-05 are included in **Table 2-4**. The costs included in each alternative are:

- Alternative 1 (No Action) – No associated capital, O&M, or periodic costs.
- Alternative 2 (Recognize, Retreat, and Report Explosive Safety Education Program) – Capital costs include labor and materials for implementation of a 3Rs Explosive Safety Education Program. Periodic costs for five-year reviews include continued public awareness and participation, and administrative record review.
- Alternative 3 (LUCs) – Capital costs include labor and materials for the installation of fencing and signs and implementation of a 3Rs Explosive Safety Education Program. Annual O&M costs include annual site inspections until the first five-year review. Periodic costs for five-year reviews include site inspection and maintenance, continued public awareness and participation, and administrative record review.
- Alternative 4 (Surface Removal of Military Munitions) – Capital costs include labor and materials for the installation of LUCs and surface removal of military munitions. Periodic costs for five-year reviews include site inspection and maintenance, continuation of the 3Rs Program, and administrative record review.
- Alternative 5 (Surface and Subsurface Removal of Military Munitions) – Capital costs include labor and materials for the surface and subsurface removal of military munitions and the costs associated with the 3Rs Explosive Safety Education Program.

2.9.8 State/Support Agency Acceptance

The TCEQ supports the implementation of Alternative 5 at MRS FTBLS-002-R-05.

2.9.9 Community Acceptance

No comments were received regarding the PP during the public comment period.

2.10 PRINCIPAL THREAT WASTES

The NCP establishes an expectation that USEPA will use treatment to address the principal threats posed by a site wherever practicable [NCP §300.430(a)(1)(iii)(A)]. Identifying principal threat wastes (PTW) combines concepts of both hazard and risk. In general, PTW are those source materials considered to be highly toxic or highly mobile, which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur.

Conversely, non-PTW are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The manner in which principal threats are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied.

Discarded military munitions (DMM) or unexploded ordnance (UXO), if any, that remain present at Fort Bliss may constitute a principal threat to human health at MRS FTBLS-002-R-05 due to the potential for it to pose an explosive hazard if the material is moved, handled or disturbed. If UXO or DMM are later encountered or surfaces in those areas originally addressed by the selected remedy, DoD explosive ordnance disposal personnel or similarly qualified personnel will evaluate the material to determine if it poses an explosive hazard. Such material that is determined to pose an explosive hazard (may also be categorized as munitions and explosives of concern (MEC)) will normally be treated on site or removed for destruction per applicable DoD explosives safety standards and environmental laws and regulations. The Department of Army and the EPA will consult, in accordance with the terms of the Fort Bliss Federal Facility Agreement, to make a determination as to whether the material encountered and determined to pose an explosive hazard, should be classified as a PTW, as defined by CERCLA, the NCP and EPA guidance. If the material is determined to be a PTW, the Department of Army will take the necessary actions to ensure protectiveness of human health and the environment to address unacceptable risks posed by the material designated as a PTW.

The principal threat identified at MRS FTBLS-002-R-05 is addressed by each of the alternatives as follows:

- Alternative 2 addresses the potential for principal threat waste to exist by informing receptors of the risk associated with the potential presence of MEC.
- Alternatives 3 and 4 addresses the potential for principal threat waste to exist by informing receptors of the risk associated with the munitions that may be present and could be determined to be MEC and actions to take to avoid such risk, implementing LUCs, and physically removing munitions from the MRS's surface.
- Alternative 5 addresses the principal threat by physically removing military munitions from the surface and subsurface of the site to a depth of 4 feet bgs and implementing an Explosive Safety Education Program.

2.11 SELECTED REMEDY

The primary indicator of remedial action performance will be satisfying the RAOs for MRS FTBLS-002-R-05 and protecting human health and the environment. Performance measures are defined herein as the RAOs plus the required actions to achieve the objectives, as defined in this section. It is anticipated that successful implementation, operation, maintenance, and completion of the performance measures will achieve a protective and legally compliant remedy for MRS FTBLS-002-R-05.

Alternative 5 –Surface and Subsurface Removal of Military Munitions with a follow on Explosive Safety Education Program was selected based upon its ability to comply with ARARs, protect human health and the environment, and cost effectiveness. The Army and TCEQ believe that the selected remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria.

2.11.1 Remedy Cost Estimate Summary

The estimated total cost of Alternative 5 is \$1,368,906. This total cost includes the provisions for the follow-on implementation of a 3Rs (Recognize, Retreat, Report) Explosive Safety Education Program. A cost summary for the implementation of Alternative 5 is included in **Table 2-4**. The information in this cost summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the costs are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences, or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.11.2 Expected Outcomes of Selected Remedy

The expected outcome of Alternative 5 will be to reduce and/or eliminate exposure to MEC hazards at the site to human receptors. The removal will remove potential sources of hazardous substances (i.e., potential surface and subsurface military munitions that may upon evaluation by qualified personnel be determined to be MEC) from the surface and up to four feet below the ground surface. Additionally, Alternative 5 will promote communication between the public and Fort Bliss, and to inform receptors of the risks associated with potential MEC at MRS FTBLS-002-R-05. Following implementation of the remedy, five-year reviews will be completed to evaluate the continued protectiveness of the remedy.

2.12 STATUTORY DETERMINATIONS

The selected remedy for the MRS is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver) (ARARs), is cost effective, and uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

The Army and TCEQ have determined that the selected remedy meets the requirements of CERCLA §121 and the NCP. Based on the information available at this time, the Army and TCEQ believe the selected remedy will be protective of human health and the environment, will comply with ARARs, will be cost-effective, and will utilize permanent solutions to the maximum extent practicable. This selected remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

2.12.1 Protection of Human Health and the Environment

The selected remedy, Alternative 5, will protect human health and the environment by permanently removing identified MEC from the surface and subsurface of the site while providing continuing education regarding potential MEC at MRS FTBLS-002-R-05.

2.12.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP 40 CFR §300.430(f)(1)(ii)(B) state that on-site remedial actions selected in a ROD must attain those ARARs that are identified at the time of ROD signature or provide grounds for invoking a waiver under §300.430(f)(1)(ii)(C).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. NCP 40 CFR §300.400(g)(4) states that only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable or relevant and appropriate. For purposes of identification and notification of promulgated state standards, the term promulgated means that the standards are of general applicability and are legally enforceable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site so that their use is well suited to the particular site (40 CFR §300.5).

The “compliance with ARARs” criterion addresses whether a remedy will attain ARARs under federal environmental and state environmental or facility siting laws or provides grounds for invoking a waiver. Overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived) are threshold requirements that each alternative must meet in order to be eligible for selection (40 CFR §300.430[f][1][i][A]).

ARARs fall into three categories: chemical-specific, location-specific, and action-specific.

- Chemical-specific ARARs are health-based or risk-management-based numbers that provide concentration limits for the occurrence of a chemical in the environment at agreed-upon points of compliance.
- Location-specific ARARs restrict activities in certain sensitive environments.
- Action-specific ARARs are activity-based or technology-based, and typically control remedial activities that generate hazardous wastes (such as with those covered under the Resource Conservation and Recovery Act).

Criteria to be considered (TBCs), are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Tables 2-5, 2-6, and 2-7 summarize the ARARs and TBCs for the selected remedy at MRS FTBLS-002-R-05. The selected remedy complies with the chemical-specific, location-specific, and action-specific ARARs/TBCs. The implementation of the remedy is required to meet the

substantive portions of these requirements at agreed-upon points of compliance and is exempt from administrative requirements such as permitting and notifications.

2.12.3 Cost Effectiveness

In the Army's judgment, the selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (40 CFR 300.430[f][1][ii][D]). This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria (that is, is protective of human health and the environment and ARAR-compliant).

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy for MRS FTBLS-002-R-05 was demonstrated in the comparative analysis of alternatives (**Section 2.9** – Summary of Comparative Analysis of Alternatives). The estimated present value cost of the selected remedy (in 2014 dollars) is \$1,322,029. Alternative 5 would remove the military munitions from the surface and subsurface to a depth of 4 feet bgs thus providing protection of human health while providing follow-on MEC education and information. Alternative 5 would help eliminate the MEC risk and allow for Fort Bliss to potentially pursue NFA for the MRS at a later date. Alternative 5 provides an acceptable level of protection of human health at a reasonable cost for implementation making it the most cost effective alternative to achieve the RAO for this MRS. This cost includes the provisions for the follow-on implementation of a 3Rs (Recognize, Retreat, Report) Explosive Safety Education Program as described in Alternative 2 at MRS FTBLS-002-R-05.

2.12.4 Use of Permanent Solutions and Alternative Treatment Technologies

The Army has determined that the selected remedy provides the best balance of trade-offs among the alternatives considered with respect to the five-balancing criteria set out in NCP 300.430(f)(1)(i)(B). As such, it represents the maximum extent to which permanence can be practicably applied at MRS FTBLS-002-R-05. NCP 300.430(f)(1)(ii)(E) provides that the balancing will emphasize the factors of "long-term effectiveness" and "reduction of toxicity, mobility or volume through treatment," and will consider the preference for treatment and bias against off-site disposal.

The Army has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a practicable manner at this MRS. Of the alternatives protective of human health and the environment and that comply with ARARs, the Army has determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the (a) statutory preference for treatment as a principal element; (b) the bias against off-site treatment; and (c) disposal and considering state and community acceptance.

The selected remedy, Alternative 5, manages the potential risks to human health and the environment by permanently removing MEC from the surface and subsurface (to 4 feet bgs) of the MRS. The selected remedy results in a permanent reduction in risk and volume of MEC and can be implemented in a relatively short period of time. The selected remedy is technically and administratively feasible and provides the best balance of long-term effectiveness and reduction of risk to human health.

2.12.5 Preference for Treatment as a Principal Element

The selected remedy and the remedial process at MRS FTBLS-002-R-05 focuses on treatment of principal site threats (i.e. MEC). The selected remedy for MRS FTBLS-002-R-05 does satisfy the statutory preference for treatment as a principal element of the remedy.

2.12.6 LTM Review Requirements

Pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C), because the selected remedy, at completion, may result in MEC remaining on-site, LTM reviews will be required. Reviews will be completed once every five years for MRS FTBLS-002-R-05. These reviews will examine the remedy to determine if the explosive safety education program remains protective of human health.

2.13 DOCUMENTATION OF SIGNIFICANT CHANGES

Alternatives 2, 4, and 5 underwent a title change in order to align with Department of Defense common terminology. Alternative 2 was changed from Public Awareness Program to Recognize, Retreat, and Report (3Rs) Explosive Safety Education Program. Alternative 4 was changed from MEC Surface Clearance to Surface Removal of Military Munitions. Alternative 5 was changed from MEC Surface and Subsurface Removal to Surface and Subsurface Removal of Military Munitions.

Additionally, Alternative 4 and Alternative 5 added the provisions of Alternative 2 as part of the remedy in order to provide an additional layer of protection and reduction of risk.

TABLE 2-1
STATE AND FEDERAL LISTED THREATENED AND ENDANGERED SPECIES
MRS FTBLS-002-R-05
FORT BLISS, EL PASO, TEXAS

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat
American Peregrine Falcon (bird)	<i>Falco peregrinus anatum</i>	Delisted	Threatened	Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in the U.S. and Canada, winters along coast and farther south; occupies wide range of habits during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands. Tall cliffs are potentially present in parts of the MRSs that extend into the Hueco Mountains. Present or potentially present in El Paso County.
Northern Aplomado Falcon (bird)	<i>Falco femoralis septentrionalis</i>	Endangered	Endangered	Open country, especially savanna and open woodland, and sometimes in very barren areas; grassy plains and valleys with scattered mesquite, yucca, and cactus; nests in old stick nests of other bird species. Desert grassland vegetation within the MRSs is consistent with the grassy plains habitat. Present or potentially present in El Paso County.
Black-footed Ferret (mammal)	<i>Mustela nigripes</i>	Endangered	Not Listed	Inhabits prairie dog towns. Only expected to occur in the presence of prairie dog towns. It is not known if prairie dog towns are within the MRSs. Present or potentially present in El Paso County.
Gray Wolf (mammal)	<i>Canis lupus</i>	Endangered	Endangered	Formerly known throughout the western two-thirds of Texas in forests, brushlands, or grasslands. Present or potentially present in El Paso County.
Chihuahuan Desert Lyre Snake (reptile)	<i>Trimorphodon wilkinsonii</i>	Not Listed	Threatened	Mostly crevice-dwelling in predominantly limestone-surfaced desert northwest of the Rio Grande from Big Bend to the Franklin Mountains, especially in areas with jumbled boulders and rock faults/fissures; secretive; egg-bearing; eats mostly lizards. Parts of the Hueco Mountains would likely exhibit features such as crevices and large rock fragments/boulders. Present or potentially present in El Paso County.

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TABLE 2-1
STATE AND FEDERAL LISTED THREATENED AND ENDANGERED SPECIES
MRS FTBLS-002-R-05
FORT BLISS, EL PASO, TEXAS

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat
Mountain Short-Horned Lizard (reptile)	<i>Phrynosoma hernandesi</i>	Not Listed	Threatened	Diurnal, usually in open, shrubby, or openly wooded areas with sparse vegetation at ground level; soil may vary from rocky to sandy; burrows into soil or occupies rodent burrow when inactive; eats ants, spiders, snails, sowbugs, and other invertebrates; inactive during cold weather. Shrubs and sandy/rocky soil within the MRSs is consistent with the habitat preferred by this lizard. Present or potentially present in El Paso County.
Texas Horned Lizard (reptile)	<i>Phrynosoma cornutum</i>	Not Listed	Threatened	Lives in open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush, or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rocks when inactive. Desert Grassland and Chihuahuan Desert Scrub vegetation are consistent with this lizard's preferred habitat. Present or potentially present in El Paso County.

Sources:

U.S. Fish & Wildlife Service website http://www.fws.gov/southwest/es/ES_Lists_Main2.html

Texas Parks & Wildlife Department website <http://tpwd.texas.gov/gis/rtest/>

Notes:

Species included in the above table are those listed as either threatened or endangered with either the U.S. Fish & Wildlife Service or Texas Parks & Wildlife Department and have a potential to be present within the MRSs based on the species' preferred habitat and reported presence or potential presence in El Paso County.

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TABLE 2-2
ARCHEOLOGICAL SITES RESIDING IN FORMER MANEUVER AREA A MRS
MRS FTBLS-002-R-05
FORT BLISS, EL PASO, TEXAS

Site Number	Date Recorded	Age	Description	NRHP Eligibility	Recommendations
41EP10	12/17/1965	Prehistoric	Camp, rock art	Unevaluated	Testing
41EP32	1963, 1965	Prehistoric	Midden circles	Unevaluated	None
41EP503	1975-1976	Prehistoric	Hamlet (pottery and hearths)	Unevaluated	None
41EP504	Unknown	Unknown	Unknown	Unknown	Unknown
41EP515	1975	Prehistoric	Camp	Not Eligible	No excavation potential
41EP526	1975-1976	Prehistoric	Camp (artifacts and hearths)	Not Eligible	Further investigations
41EP2563	1975-1976	Prehistoric	Lithic scatter	Not Eligible	No further work
41EP2565	1975-1976	Prehistoric	Small camp (sherds)	Not Eligible	No further work
41EP2609	9/5/1985	Prehistoric	Artifact scatter (lithics, ceramics)	Not Eligible	No further work
41EP2628	11/25/1987	Prehistoric	Artifact scatter (lithics, ceramics)	Not Eligible	No further work
41EP2630	11/25/1987	Prehistoric	Artifact scatter (lithics, ceramics)	Not Eligible	No further work
41EP2632	12/2/1987	Prehistoric	Artifact scatter (lithics, ceramics)	Not Eligible	No further work
41EP2634	12/5/1987	Prehistoric	Ceramic scatter, hearth	Not Eligible	No further work
41EP4682	Unknown	Unknown	Unknown	Unknown	Unknown
41EP4683	Unknown	Unknown	Unknown	Unknown	Unknown
41EP4684	5/3/1995	Prehistoric	Hearth	Not Eligible	No further work
41EP4861	11/7/1994	Prehistoric	Concentration of burned caliche	Not Eligible	No further work
41EP4865	11/8/1994	Prehistoric	Camp (artifacts and hearths)	Not Eligible	No further work
41EP4871	1/21/1995	Prehistoric	Camp (artifacts and hearths)	Eligible	Avoid or protect
41EP5562	7/13/2002	Prehistoric	Habitation	Eligible	Avoid or protect

Notes:

Information for this table was obtained from the Texas Historical Commission Archeological Sites Atlas

NRHP = National Register of Historic Places

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TABLE 2-3
DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES
MRS FTBLS-002-R-05
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EVALUATION CRITERIA	Alternative 1 - No Action	Alternative 2 - Public Awareness Program	Alternative 3 - Land Use Controls	Alternative 4 - MEC Surface Clearance	Alternative 5 - MEC Surface Clearance and MEC Subsurface Removal
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT					
Human Health Protection	This alternative provides no protection to human health and does not provide any reduction in explosive hazards. MEC, if any, would not be eliminated, reduced, or controlled through treatment, engineering, and/or LUCs.	This alternative provides a low level of protection to human health and does not provide any reduction in explosive hazards. MEC, if any, would not be eliminated, reduced, or controlled through treatment, engineering, or LUCs. Alternative 2 provides a public awareness program to promote communication between the public and Fort Bliss, and to inform receptors of the potential MEC risks associated with the MRSs.	This alternative provides a low level of protection to human health and does not provide any reduction in explosive hazards. Potential MEC would not be eliminated or reduced. Potential MEC interactions would be limited through LUCs.	This alternative provides a medium level of protection to human health and a medium level reduction in explosive hazards on the surface of the MRSs by eliminating or reducing the amount of surface MEC. Potential subsurface MEC interactions would be limited through LUCs.	This alternative provides a high level of protection to human health and a high level of reduction in explosive hazards on the surface and subsurface of the MRSs by eliminating or reducing the amount of surface and subsurface MEC.
Environmental Protection	MEC is not expected to have a significant negative impact on the ecosystem.	MEC is not expected to have a significant negative impact on the ecosystem.	MEC is not expected to have a significant negative impact on the ecosystem.	MEC is not expected to have a significant negative impact on the ecosystem.	MEC is not expected to have a significant negative impact on the ecosystem.
COMPLIANCE WITH ARARs					
Compliance with ARARs	No applicable ARARs	No applicable ARARs	No applicable chemical-specific or action-specific ARARs. Planning would be required to comply with location-specific ARARs.	Planning would be required to comply with chemical-specific, location-specific, and action- specific ARARs.	Planning would be required to comply with chemical-specific, location-specific, and action- specific ARARs.
LONG-TERM EFFECTIVENESS					
Magnitude of Residual Risk	Risks to potential future receptors would remain indefinitely.	Risks to potential future receptors would remain indefinitely.	Risks to potential future receptors would remain indefinitely.	Risks to potential future receptors would remain for intrusive activities and for any potentially unidentified MEC.	Risks to potential receptors would remain for any potentially unidentified MEC.
Adequacy and Reliability of Controls	Not applicable	The overall effectiveness of this alternative would depend on the support, involvement, and willingness of local agencies and landowners.	Engineering controls should offer some level of protection by restricting access to the MRS and providing adequate warning to potential receptors. However, an on-site land manager would not be present to ensure that engineering controls are effective.	The MEC surface clearances would effectively reduce the probability of encountering MEC at the surface of the MRS. However, this alternative does not address the risk associated with subsurface MEC, where a large percentage of MEC is anticipated to be found. Over time, subsurface MEC may be exposed at the surface through erosion. Risks to receptors completing intrusive activities within the MRSs would remain. Since subsurface MEC would not be removed, LUCs would still be required.	The MEC surface clearances and MEC subsurface removals would effectively reduce the probability of encountering MEC at the surface and within the subsurface of the MRSs.
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME					
Treatment Process Used	None	None	None	Disposal of MEC by detonation.	Disposal of MEC by detonation.
Reduction of TMV	None	None	None	Total volume of MEC would be reduced by the amount removed from the surface.	Total volume of MEC would be reduced by the amount removed from the surface and subsurface.
SHORT-TERM EFFECTIVENESS					
Time Required to Achieve Remedial Action Objectives	Indefinite	Indefinite	RAO would be met upon implementation of LUCs.	RAO would be met upon implementation of LUCs and completion of the remedial action. The time required for the MEC surface clearances would be dependent on available resources.	RAO would be met upon completion of the remedial action. The time required for the MEC surface clearances and MEC subsurface removals would be dependent on available resources.

TABLE 2-3
DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES
MRS FTBLS-002-R-05
FORT BLISS, EL PASO, TEXAS

EVALUATION CRITERIA	Alternative 1 - No Action	Alternative 2 - Public Awareness Program	Alternative 3 - Land Use Controls	Alternative 4 - MEC Surface Clearance	Alternative 5 - MEC Surface Clearance and MEC Subsurface Removal
Protection of Community During Remedial Action	No action taken.	No action taken.	Potential short-term impacts may include increased traffic flow on public roads used by the trucks to transport fence and sign materials; however, these potential impacts are expected to be minimal and would not require extensive planning.	Potential short-term impacts may include increased traffic flow on public roads used by the trucks to transport fence and sign materials; however, these potential impacts are expected to be minimal and would not require extensive planning. MEC field activities could potentially involve additive short-term impacts to the community during MEC disposal operations. Appropriately trained personnel, safety procedures, protective equipment, and approved planning documents (e.g., ESS) would be used to reduce impacts to the workers, environment, and community.	MEC field activities could potentially involve additive short-term impacts to the community during MEC disposal operations. Appropriately trained personnel, safety procedures, protective equipment, and approved planning documents (e.g., ESS) would be used to reduce impacts to the workers, environment, and community.
Protection of Workers During Remedial Action	No action taken.	No action taken.	Placement of fencing and/or warning signs along the perimeter of the MRS poses a risk for construction workers to come in contact with potential MEC. These short-term risks to workers would be limited through the implementation of an approved health and safety plan and use of UXO safety support during construction field activities.	For LUCs, see Alternative 3. The MEC surface clearance poses a moderate to high risk to site workers during MEC-related activities. Appropriately trained personnel, safety procedures, protective equipment, and approved planning documents would be used to reduce impacts to the workers, environment, and community.	The MEC fieldwork poses a moderate to high risk to site workers during MEC-related activities. Appropriately trained personnel, safety procedures, protective equipment, and approved planning documents would be used to reduce impacts to the workers, environment, and community.
IMPLEMENTABILITY					
Technical Feasibility	Not applicable	Alternative uses well-established processes that are technically feasible.	Alternative uses well-established processes that are technically feasible.	Alternative uses well-established processes that are technically feasible.	Alternative uses well-established processes that are technically feasible.
Administrative Feasibility	Not applicable	Alternative is considered administratively feasible. This alternative has no construction activities to implement and ROE agreements would not be required. Administratively, a process substantially similar to this alternative was implemented at Fort Bliss (i.e., Community Relations Plan) during the RI.	Administratively, implementation of Alternative 3 could be difficult. None of the land associated with the MRS is currently owned or used by Fort Bliss.	Administratively, implementation of Alternative 4 could be difficult. The MRS encompasses 203 acres. None of the land associated with the MRS is currently owned or used by Fort Bliss.	Administratively, implementation of Alternative 4 could be difficult. The MRS encompasses 203 acres. None of the land associated with the MRS is currently owned or used by Fort Bliss.
Availability of services and materials	Not applicable	Services and materials are readily available.	Services and materials are readily available.	Detection and disposal technologies are readily available and moderately easy to implement. Field activities would require extensive logistic support and planning due to land ownership.	Detection and disposal technologies are readily available and moderately easy to implement. Field activities would require extensive logistic support and planning due to land ownership.

Notes:
ARAR = Applicable or Relevant and Appropriate Requirements
ESS = Explosives Safety Submission
LUC = land use control
MEC = munitions and explosives of concern
MRS = munitions response site

RAO = Remedial Action Objective
RI = remedial investigation
ROE = right-of-entry
TMV = Toxicity, Mobility, or Volume
UXO = unexploded ordnance

TABLE 2-4
COST SUMMARY OF REMEDIAL ACTION ALTERNATIVES
MRS FTBLS-002-R-05
FORT BLISS, EL PASO, TEXAS

	Alternative 1 - No Action	Alternative 2 - 3Rs (Recognize, Retreat, Report) Explosive Safety Education Program	Alternative 3 - Land Use Controls	Alternative 4 - MEC Surface Clearance	Alternative 5 - MEC Surface Clearance and MEC Subsurface Removal
Description					
Total Project Duration (Years)	0	30	30	30	1
Capital Cost	\$0	\$88,406	\$490,273	\$963,017	\$1,090,750
Total O&M/Periodic Cost	\$0	\$189,750	\$548,226	\$548,226	\$0
Total Cost of Alternative¹	\$0	\$278,156	\$1,038,500	\$1,511,244	\$1,090,750
Total Present Value of Alternative	\$0	\$231,279	\$929,491	\$1,402,235	\$1,090,750

Notes

¹Cost estimates are developed in the FS primarily for the purpose of comparing remedial action alternatives, not for establishing project budgets.

FS = Feasibility Study

MEC = munitions and explosives of concern

O&M = Operations and Maintenance

Final Record of Decision - MRS FTBLS-002-R-05
Fort Bliss, El Paso, Texas
W912BV-11-D-0016, TO 0002

TABLE 2-5
LIST OF POTENTIAL CHEMICAL-SPECIFIC ARARs
MRS FTBLS-002-R-05
FORT BLISS, EL PASO, TEXAS

Standard, Requirement, or Criteria	Description	Comment on Chemical-Specific ARARs
FEDERAL		
<u>Protection of Environment Code of Federal Regulations Title 40</u>		
Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (40 CFR 266.03, 266.205, and 266.206)	These regulations identify standards applicable to the transportation, storage, treatment, and disposal of waste military munitions.	These regulations provide standards of control or substantive requirement due to the anticipated presence of MEC and/or MD and are therefore applicable for the MRSSs.

ARAR = Applicable or Relevant and Appropriate Requirements

CFR = Code of Federal Regulations

MD = munitions debris

MEC = munitions and explosives of concern

MRS = Munitions Response Site

Final Record of Decision - MRS FTBLS-002-R-05
Fort Bliss, El Paso, Texas
W912BV-11-D-0016, TO 0002

TABLE 2-6
LIST OF POTENTIAL LOCATION-SPECIFIC ARARs
MRS FTBLS-002-R-05
FORT BLISS, EL PASO, TEXAS

Standard, Requirement, or Criteria	Description	Comment on Location-Specific ARARs
FEDERAL		
<u>Endangered Species Act</u> [16 U.S.C. § 1538(a)(1)(B) and 16 U.S.C. § 1538(a)(2)(B)]	Prohibits any person from taking species from within the United States. Additionally prohibits the removal, digging up, damaging, or destroying any species knowingly or in the process of criminal trespassing.	Applicable if any federal-listed species are present and will be removed from the site by the completion of the remedial action.
<u>Migratory Bird Treaty Act</u> (16 U.S.C. § 703)	Title 16, Subchapter II §703 states that it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof, included in the Migratory Bird Treaty Act.	Applicable if any federal-listed species are present and will be removed from the site by the completion of the remedial action.
STATE		
<u>Environmental Quality</u> (TAC Title 31)		
<u>Protection of State-Listed Animal Species</u> (31 TAC §65.171)	Section 65.171 of the TAC states that except as otherwise provided in the subchapter or Parks and Wildlife Code, Chapters 67 or 68, no person may take, possess, propagate, transport, export, sell or offer for sale, or ship any species of fish or wildlife listed by the department as endangered or threatened.	Applicable if any state-listed species are present and will be removed from the site by the completion of the remedial action.
<u>TPW Code</u> (Section 68.015)	Section 68.015 of the TPW Code states that no person may capture, trap, take, or kill, or attempt to capture, trap, take, or kill, endangered fish or wildlife.	Applicable if any state-listed species are present and will need to be captured or may be killed by the completion of the remedial action.

ARAR = Applicable or Relevant and Appropriate Requirements

TAC = Texas Administrative Code

TPW = Texas Parks and Wildlife

U.S.C. = United States Code

Final Record of Decision - MRS FTBLS-002-R-05
Fort Bliss, El Paso, Texas
W912BV-11-D-0016, TO 0002

TABLE 2-7
LIST OF POTENTIAL ACTION-SPECIFIC ARARs
MRS FTBLS-002-R-05
FORT BLISS, EL PASO, TEXAS

Standard, Requirement, or Criteria	Description	Comment on Action-Specific ARARs
FEDERAL		
<u>Protection of Environment Code of Federal Regulations Title 40</u>		
Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (40 CFR 266.03, 266.205, and 266.206)	These regulations identify standards applicable to the transportation, storage, treatment, and disposal of waste military munitions.	These regulations provide standards of control or substantive requirement due to the anticipated presence of MEC and/or MD and are therefore applicable for the MRSSs.

ARAR = Applicable or Relevant and Appropriate Requirements

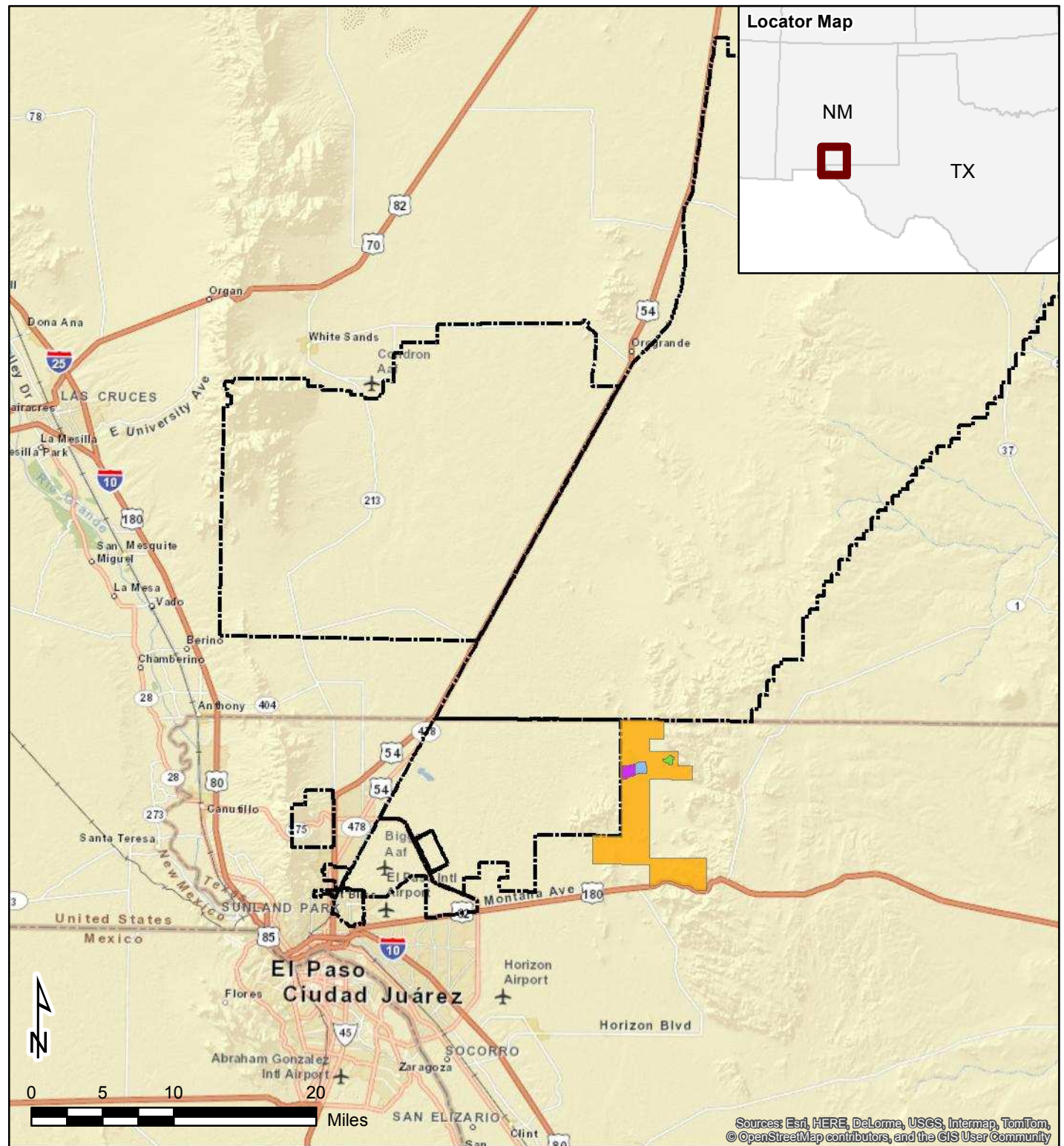
CFR = Code of Federal Regulations

MD = munitions debris

MEC = munitions and explosives of concern

MRS = Munitions Response Site

Final Record of Decision - MRS FTBLS-002-R-05
Fort Bliss, El Paso, Texas
W912BV-11-D-0016, TO 0002



Legend

- Installation Boundary
- Former Maneuver Area MRS (FTBLS-002-R-01)
- Former Maneuver Area MRS (FTBLS-002-R-03)
- Former Maneuver Area MRS (FTBLS-002-R-04)
- Former Maneuver Area MRS (FTBLS-002-R-05)

URS

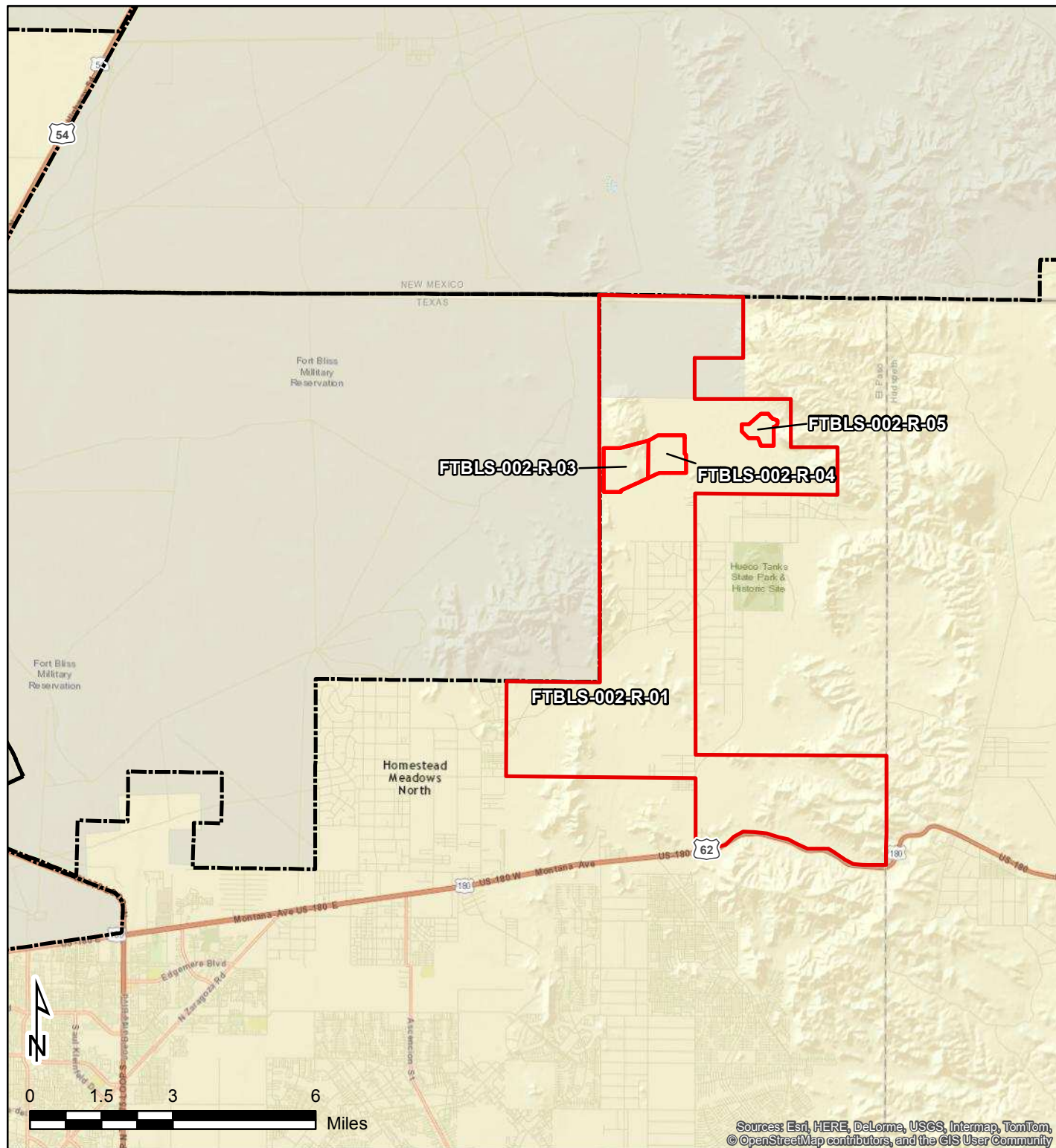


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Regional Location Map Fort Bliss El Paso, Texas

Drawn By: JZ	Date: 10/22/2015
Checked By: PW	Project No. 60417030

Figure 2-1



Legend

- Installation Boundary
- MRS Boundary

URS



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MRS Location Map Former Maneuver Area Fort Bliss El Paso, Texas

Drawn By: JZ	Date: 10/22/2015
Checked By: PW	Project No. 60417030

Figure 2-2

FIGURE 2-3
MEC CONCEPTUAL SITE MODEL FOR MRS FTBLS-002-R-05
FORT BLISS, TEXAS

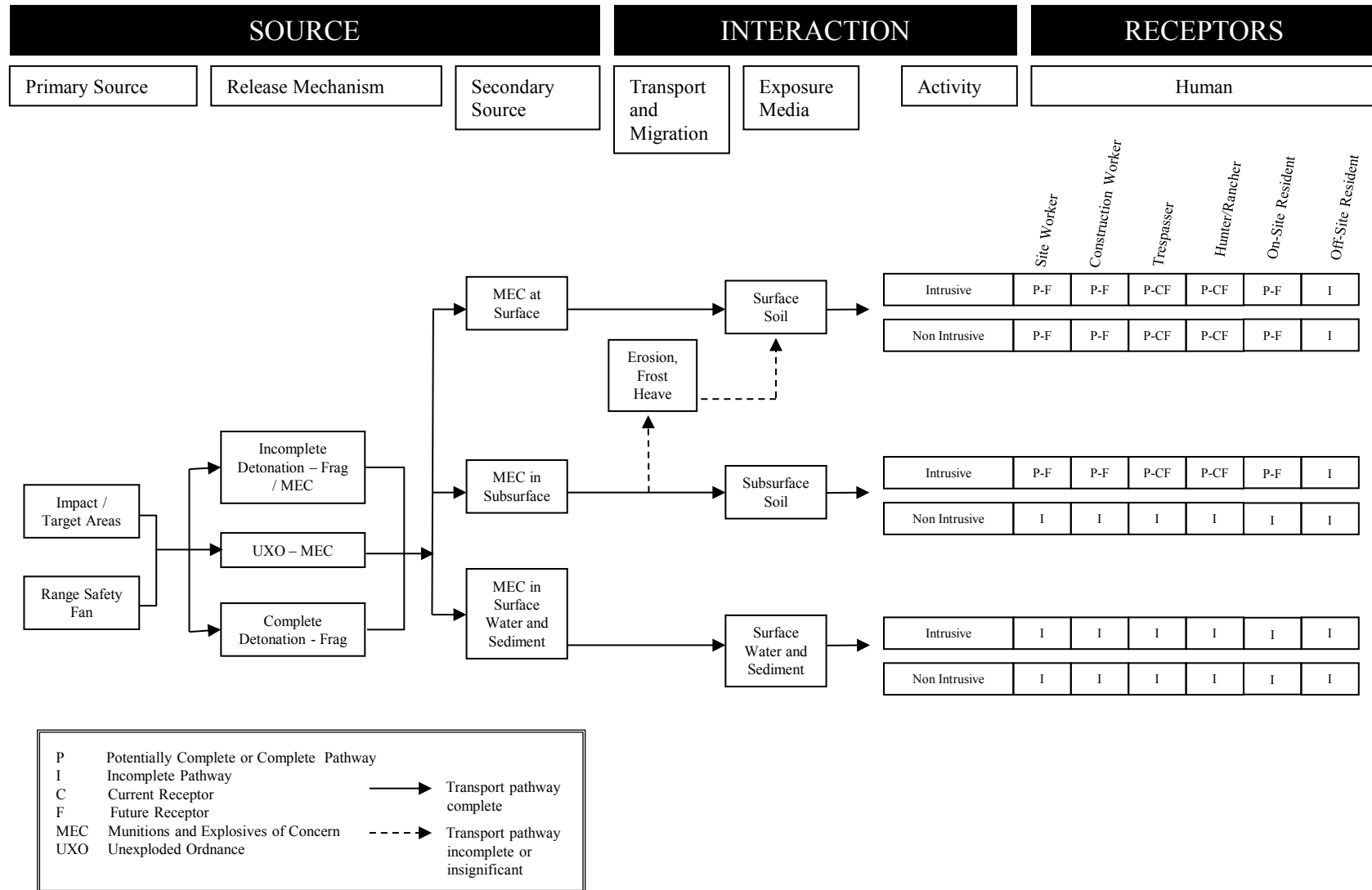
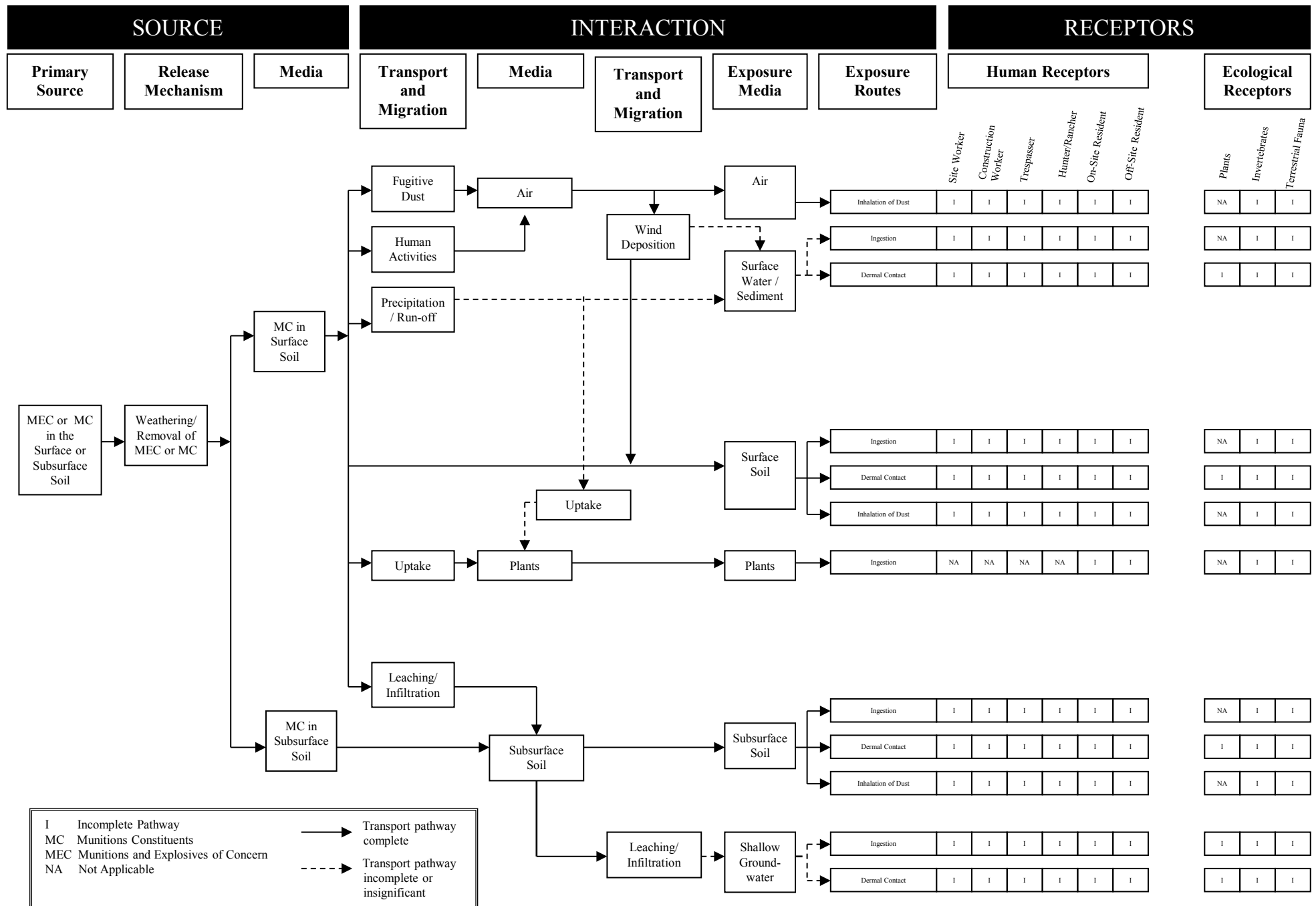
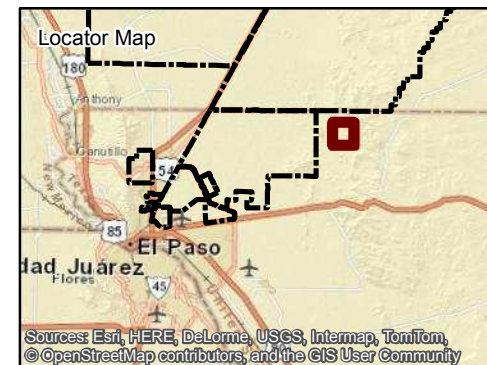


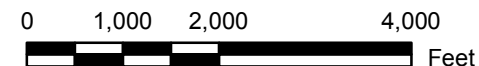
FIGURE 2-4
MC CONCEPTUAL SITE MODEL FOR MRS FTBLS-002-R-05
FORT BLISS, TEXAS





Legend

- Installation Boundary
- MRS Boundary
- Engineering Controls (i.e., fence and warning signs)



URS

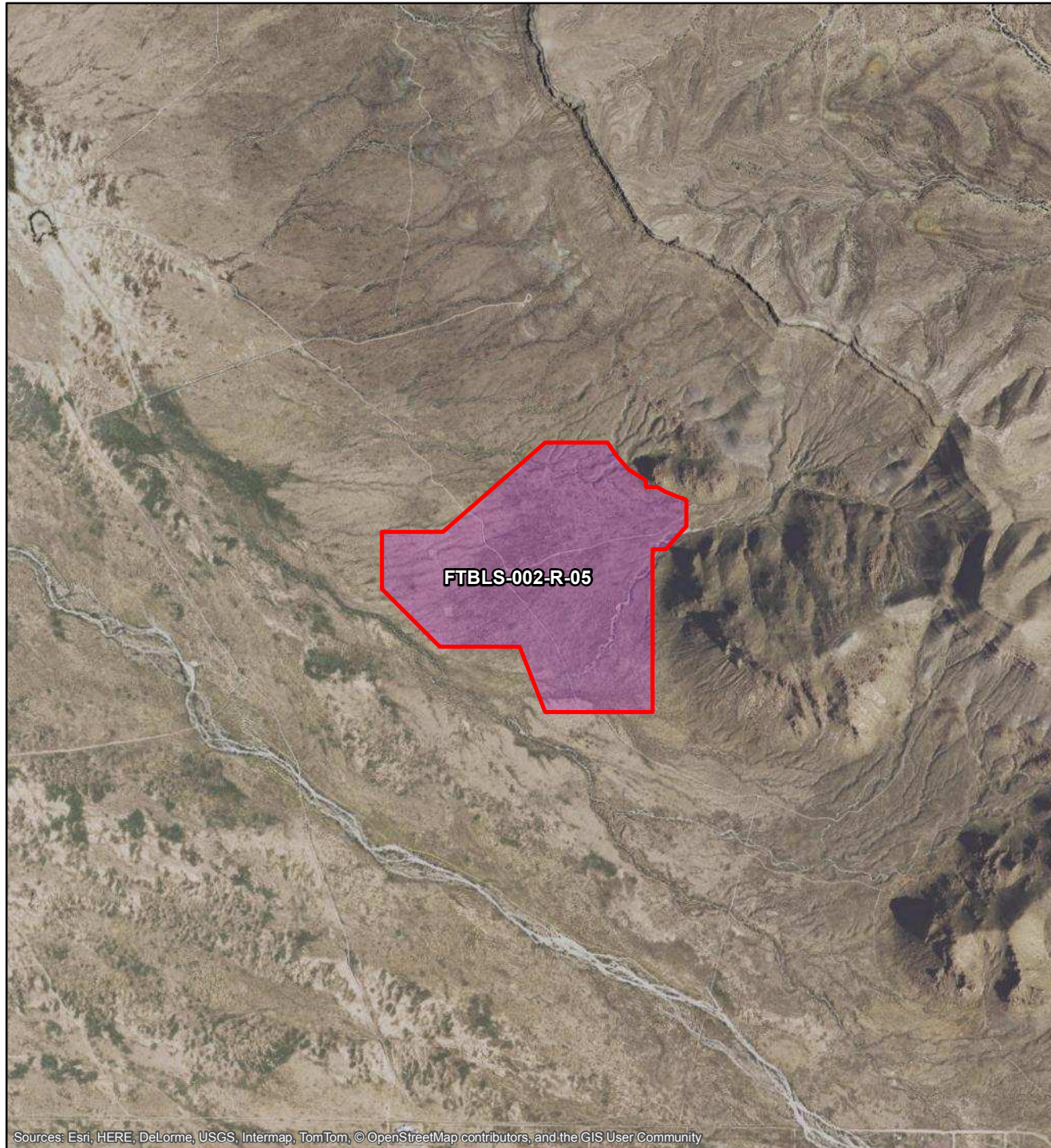


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Alternative 3 - Land Use Controls Former Maneuver Area Fort Bliss El Paso, Texas

Drawn By: JZ	Date: 10/22/2015
Checked By: PW	Project No. 60417030




Figure 2-5

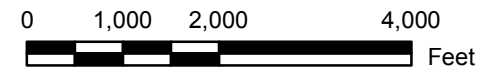


Sources: Esri, HERE, DeLorme, USGS, Intermap, TomTom, © OpenStreetMap contributors, and the GIS User Community



Legend

-  Installation Boundary
-  MRS Boundary
-  Proposed MEC Surface Removal



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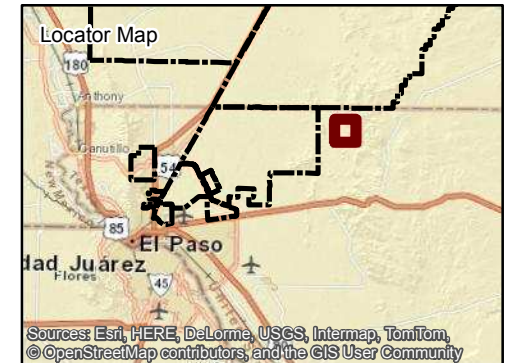
Alternative 4 - Surface Removal of DoD Military Munitions Fort Bliss El Paso, Texas

Drawn By: JZ	Date: 10/22/2015
Checked By: PW	Project No. 60417030




Figure 2-6

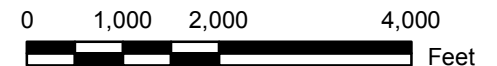


Sources: Esri, HERE, DeLorme, USGS, Intermap, TomTom, © OpenStreetMap contributors, and the GIS User Community



Legend

-  Installation Boundary
-  MRS Boundary
-  Proposed MEC Surface and Subsurface Removal



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Alternative 5 - Surface and Subsurface Removal of DoD Military Munitions Fort Bliss, El Paso, Texas

Drawn By:
JZ

Date:
10/22/2015

Checked By:
PW

Project No.
60417030

Figure 2-7

This section provides a summary of the public comments regarding the PP for remedial action at MRS FTBLS-002-R-05 and the Army response to comments. At the time of the public review, the Army had selected Alternative 5 – Surface and Subsurface Removal of Military Munitions as the preferred alternative for the site.

No comments were received during the public comment period.

3.1 STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

The TCEQ concurred with the conclusions and recommendations of the FS that were presented to the public in the PP.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues were identified during the public review period of the PP.

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- TLI Solutions, Inc. 2011. MMRP Final Site Inspection Report. Fort Bliss, El Paso, Texas. March.
- URS. 2014. Final Remedial Investigation Report, Former Maneuver Area A, Fort Bliss, El Paso, Texas. November.

- URS. 2016a. Final Feasibility Study, Former Maneuver Area A, Fort Bliss, El Paso, Texas. May.
- URS. 2016b. Revised Draft Proposed Plan, Former Maneuver Area A, Fort Bliss, El Paso, Texas. May.
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- USACE. 2008. Explosives Safety and Health Requirements Manual. EM 385-1-97. September. (Errata 1 through 5 dated June and July 2009 and April 2010).
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- United States Environmental Protection Agency (USEPA). 1999. A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedial Selection Decision Document. July.
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Notice of Public Meeting
Department of the Army
Fort Bliss, Texas

The U.S. Army, the Army Corps of Engineers, and Fort Bliss will be holding a Public Meeting to present the results of the Fort Bliss Former Maneuver Area A Remedial Investigation Project conducted in 2013. Former Maneuver Area A is located approximately 30 miles east of El Paso near the eastern border of El Paso County on the north side of Montana Avenue. The Former Maneuver Area A adjoins the eastern boundary of Fort Bliss but is not located within the boundaries of or owned by Fort Bliss. This area has not been utilized for Army maneuver activities since the property was relinquished by the Army in the 1980s. The purpose of the investigation was to characterize the nature and extent of potential contamination and potential explosive safety hazards on property previously used by Fort Bliss for military training activities. The purpose of the Public Meeting is to:

- Provide an overview of the investigation
- Present the remedy selected to address munitions and explosives of concern identified
- Receive input from the public and answer questions

The meeting will be held on Wednesday, November 16, 2016 at 6:30 pm at the Montana Vista Elementary School located at 3550 Mark Jason Drive, El Paso, Texas 79938. Copies of the proposed plans are maintained at the information repository at the Directorate of Public Works – Environmental (DPW-ED) at Building 622 Taylor Road, Fort Bliss, Texas 79916. The public comment period will begin on November 7, 2016 and end on December 6, 2016.

